

AVIATION WEEK

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APR. 26, 1954

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Domestic

Aviation jet fuel requirements of USAF and Navy have increased 3,000 in since 1948 and will continue to rise, reports National Petroleum News, a McGraw-Hill publication. Projections set by the annual aviation petroleum planning study for fiscal 1955 show 30-million barrels.

Atomic aircraft engine ground test facilities will be built by Atomic Energy Construction Co. at the Atomic Energy Commission's national nuclear testing station near Idaho Falls, Idaho. The \$2,821,200 second-phase contract covers first test area buildings and service facilities for a prototype propellant system.

Passage has authorized Douglas Aircraft Co. to modify its DC-7s now in order for full certification of the new Boeing Radio R20-1 electronic communication (X-band) radio. Passage now is testing an AN/APR-42 (military) radio in a DC-6B (COMMERCIAL) Westair Mar 6, p. 7.

Flight Safety Foundation is publishing a monthly business pilots safety bulletin, says the new accident prevention digest was started in response to requests by business aircraft operators. Yearly subscription price \$25.

Boeing Aviation Corp. reports its standard systems will be installed in standard equipment on American and National Airlines' DC-7 flights, already in use on Delta C-58 and United Air Lines' DC-7s.

New S-50000 inventories at the Air Force Cambridge Research Center, Bedford (Mass.) Airport, will be distributed this week (Apr. 20) by USAF Research (Hawthorne) AFRC. Headquarters Research Development and service groups will occupy the new facilities. Georgetown Research Directorate is expected to move to Bedford within two years when additional facilities, now planned, are constructed.

Sale Aircraft Co. has received a \$6.6 million order for San Diego production of components for Pratt & Whitney Aircraft J57 jet powerplants being manufactured by Ford Motor Co.'s Aircraft Engine Division under license from FAWA.

Edward E. Howard is the new president of the American Training Society, national organization of military contract schools. He is associated with



Pearl Harbor Gets Super Connie Picket

Now in the first of a fleet of radio-picked Lockheed WV-2 Super Constellation pickets Navy has assigned to Pearl Harbor, Hawaii, to watching out for the great potential aggression by sea or air. The two-engine WV-2, acceptable by the large industry projecting alone and Silver in biology, carries approximately six tons of electronic detection equipment. Note the winged auxiliary fuel tanks.

The Hawthorne School of Aeronautics, Mantoloking, N. J., offers officers of U. S. Navy and Air Force. The school is located at the Hawthorne School of Aeronautics, Mantoloking, N. J., and is open to all interested persons, regardless of military or naval service.

U. S. lightplane exports totaled \$2 million during March, valued at \$942,040, bringing overseas shipments for the first three months of 1954 to 144 units at \$2,183,012, Aircraft Industries Association reports.

Financial

Per American World Airways' net income climbed to a record \$10,985,000 in 1953, compared with the previous year's \$6,673,000. Operating revenues amounted to an all-time high \$217,850,000, a 21% higher than for 1952.

New York Airways reports a net profit of \$48,281 for 1953, compared with 1952's \$1,284. The helicopter airline's operating revenues totaled \$1,244,500, compared with \$1,016,061, one-quarter income increased from \$7,667 to \$16,681.

Passenger Airlines claims a net profit of \$60,578. Consolidated loss of both divisions \$13,475.

Republic Aviation Corp., Farmingdale, N. Y., had a net income of \$924,905 from sales totaling \$64,135,223 during the first quarter of 1954, compared with a \$1,301,650 and \$97,366, \$16 in sales for the first three months of 1953.

Delta-C-58 Air Lines' net profit for

the first quarter of that year totaled \$507,600 from gross revenues of \$13,084,000. The airline reports a \$1,040,000 loss on its International Division, operated without subsidy since Delta and C-58 merged May 1.

United Air Lines will pay a regular quarterly dividend of 25 cents from 15 to common stockholders of record May 15.

International

British's Hawker Siddeley group and its new subsidiary, High Duty Alloys (Canada), Ltd., have purchased the stock of Canadian Steel Corporation, with government assistance to produce jet engine blade forgings for Avco-Canada's Canada powerplant program.

Habert Scott-Paine partners' British aircraft designs who helped acquire Supermarine Aviation Works, died Apr. 15 at Greenwich, Conn. He was 62.

Aircraft fuel system components designed and produced by British's Flight Refueling Ltd., will be manufactured and sold in France by Societe Carburant Zouche under a 10-year license.

Continental aircraft engines will be produced by Fuji Aircraft Co. in Japan under a contract calling for a down payment of \$150,000 to the U. S. powerplant builder, royalties of \$75 each for the first 400 engines and \$78 thereafter up to a total of \$75,000.

Spada's Aeromobili has sold patents for its Mafel helicopter to French aircraft builder Renault for approximately \$62,000.



divided negative
chronal axial
thermopile

Here are these new products—the latest in T-E's expanding line of pyrometric equipment for the aviation field. That line includes not only individual items but complete thermocouple systems—with harnesses, thermocouples, leads and connectors—all carefully made in T-E's own plant.

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channel-based
thermopiles.
Single and
double band
are compared
back-to-back.

new patented
channel-shaped
members—
compact, light weight
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temperature gradient
across connectors,
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part an industry statement, it is getting little co-operation from its members.

Aircraft manufacturers would prefer to see a full-scale air policy study by an independent group, such as the Presidential Air Policy Commission of 1947. Republican Carl Hooten and Democrat Stuart Symington have been plugging for such a group in the House and Senate, respectively.

Some engine manufacturers are apt to be embarrassed by testimony of top USAF and Navy BuAer officials on the average and allowable overhaul intervals being achieved on turbine engines used by the services.

Some intermediaries have been advertising 1,200-lb. allowable between overalls for this gear. USAF Assistant Secretary for Material Roger Lewis told the House Appropriations Committee the 3,200-lb. figure represented a "poor hope" rather than actual fact.

Highest USAF allowable overall normal for an engine is now 800 lb. for an unspecified type. Highest Navy allowable overall normal is 1,000 lb. for the Pratt & Whitney F42.

CMIs inside the Pentagon face Colorado Springs as the site to be picked for the new USAF Academy.

Branch of the Budget has directed Defense Department and National Advisory Committee for Aeronautics to make a study of all woodrated facilities available and planned for aerospace research, with a view toward avoiding duplication of facilities.

USAF officials gave a complete breakdown of the 1,800 aircraft capacity cut from the procurement program for fall (Aerospace Week, Sept. 28, p. 14) when finally the budget Congress on the fiscal 1995 appropriations bill. The \$449.5-million cruise missile consisted of:

- 5,531 General Electric J47 jets costing \$45,000 each
- 1,024 Cetus Weight 161 jets costing \$50,000 each
- 2,137 Pratt & Whitney J2900 turbo engines, costing \$45,000 each.

When USAM announced the 'crisis' system only but did not intend to provide a public breakdown of the money being awarded at these prices.

Cost effectiveness studies by Ames's Operations Research Office are proving very helpful in guiding antibiotic decisions in new patients.

Recent COO study on air defense weapons shows that despite the cost of each Nike guided missile, the annual cost of maintaining this type of air defense for a given aircraft is only a fraction of that of other anti-aircraft weapons now available to the Army, says Maj Gen John T. Elwood, Assoc. R&D Chief.

Gen. Under reports that industry is showing interest in the use of operations research in a trial of emergency port.

—Wendy H. Hines, staff

J-M Clipper Seals Fly with the Sikorsky HOSS helicopter...



... seal oil in, keep abrasives out, at critical locations

Clipper Seal being installed in the intermediate gear box of the Sikorsky HOSS helicopter to seal oil in, keep abrasives out.



Photograph and cross section of Type L7D Clipper Seal. This is just one of numerous styles available to solve tough sealing problems.

To retain the lubricants vital to its complex rotor and gear systems... and to protect bearings against the infiltration of abrasives... the new Sikorsky HOSS helicopter depends on these positive sealing qualities of Johns-Manville Clipper Seals.

Clipper Seals are flexible—molded of special compounds, they have a tough, dense hull and a soft flexible lip conveniently molded into one piece.

Clipper Seals reduce friction—A specially designed garter spring holds the lip in tight but firm contact with the shaft. Thus a positive seal is always maintained but shaft wear is reduced and shoe bearing is prevented.

Clipper Seals are corrosion-resistant—The molded body is entirely non-metallic. It therefore resists both electrolysis and most forms of corrosion. And the garter spring is available in various corrosion-resistant metals.

Clipper Seals are versatile—They can be furnished in flange sections of varying widths to fit practically any shaft. Various lip designs are available... and various lip compounds provide the proper hardness for temperatures from -65F to +450F.

To find out more about Clipper Seals and their application to your particular sealing problem, write Johns-Manville, Box 60, N. Y. 14, N. Y. In Canada, 199 Bay St., Toronto 1, Ontario.



Johns-Manville PRODUCTS for the AVIATION INDUSTRY

WHO'S WHERE

In the Front Office

Alexander H. d'Amboise has been elected president of Niles-Kassid Food Co., West Hartford, Conn., filling the vacancy created by the death of Frederick S. Conrad last month (Aerospace Week May 12, p. 7). Charles W. Dorris is new head chairman, Richard W. Bunkel, executive vice president.

R. S. Cohen has been appointed corporate vice president of Collins Radio Co., Collins Rapids, Iowa. Other new vice presidents: E. E. Janssen, manufacturing; N. E. Cline, research and development; J. G. Fries, sales; and M. W. Borell, service.

Otto E. Kline has been appointed by Control Air Lines to vice president position of operations.

William T. Boole has moved to new position of director of Delta-GAS Air Lines in vice president position.

Frank E. Wells is new vice president of Zenth Aircraft, division of Zenth Aircraft Co. of Gardena, Calif. Also elected: Charles Bracken, vice president; George W. E. Eubank, vice president; engineering; Floyd H. Hahn, vice president; maintenance; and Walter Schaefer, treasury.

Walter H. Dickman has formed Wadick Engineering Co. at Garden City, N. Y., to represent aircraft and industrial product makers on the East Coast.

Col. Louis A. Skansen (USAF Ret.) has accepted a new position and manager of engineering for Oakland Tool & Arm Company of America, Asheville, N. C.

Charles H. Bess has moved to the American Air Force Academy, a new assistant to the president of Washington Electric International Co., New York.

Changes

An Vozz Maribel C. F. H. Allen has moved to London as leader with the Walsh Corporation and its subsidiaries.

Joseph P. Wells has been promoted to manager of Standard Process Steel Co. Aircraft and Allied Products Division. C. Merle Wadsworth is new regional controller for Republic Aircraft Corp., Farmingdale, N. Y.

Charles A. Harrison has joined the maintenance staff of the vice president position of Republic Aircraft Corp., Farmingdale, N. Y.

H. C. Gower has been named chief engineer for Short Bros. & Heland, Ltd., St. Helier, Northern Ireland.

Honors and Elections

Mundy Peck, president of Republic Aviation Corp. at Farmingdale, N. Y., has been awarded President's Legion of Honor.

Charles A. Paden, executive director of National Aviation Traffic Assn., has been awarded the third annual Distinguished Service Award for contributions to aviation.

Dr. John F. Manegault, executive director for the Aero Medical Assn. at the University of Illinois, has received Charles H. Latham Award for "outstanding research in 1953."

INDUSTRY OBSERVER

Stall at North American Aviation, Inc. last fall and technical problems with the Republic F-84F have been the only two sore spots in the USAF production program for the past 12 months. USAF Secretary Tammert cited "unique and structural difficulties with the F-84F" as the reason "we have had serious production delays in the F-84F program."

Cost of the Pratt & Whitney J57 turbo-compressor engine is now \$250,000 per engine, according to USAF.

Cessna T-37 jet trainer is being put into production on the initial low-rate manufacturing plan developed by USAF (Aerospace Week Apr. 12, p. 18).

Navy has reduced critical metal content of jet engine turbine blade forgings by as much as 68% in some cases.

USAF has won the battle over asphalt vs. concrete runway by specifying that whenever blacktop construction is used, there must be a thousand feet of concrete area at each end of the runway. USAF specifies the concrete area to prevent deterioration of asphalt from jet fuel spillage and engine blast during takeoff and the early portion of the landing run.

Douglas is developing a new advanced version of its Skyray Navy carrier-based fighter, designated the F4D-1. The new version will feature some configuration changes from the F4D-1 model now in production at the El Segundo Division.

Boeing Aircraft Co. is developing a large version of its B-52 Stratofortress bomber aimed at increased range and better accommodation of the hydrogen bomb.

Navy has abandoned its program to convert DC-10 to Super DC-13 transports because of price increase set by Douglas for the program. Vice Adm. Ralph O'Brien, Deputy Chief of Naval Operations for Air, recently told the House Appropriations Committee that the Super DC-13 program was a good buy at its original price but with the new figure submitted by Douglas the Navy felt it would be too expensive for modern transport-type transport equipment. Navy already has bought one Convair 440, is negotiating an order for more.

Wallops Air Force hydrofoil development to continue on a new task. Experiments with the new hydrofoil on the Convair XP2V-1 have shown good operational difficulties for this configuration, but have opened exploration of a promising new configuration.

The French are the latest to adopt the all-Boeing "Jolly" full configuration for improved fighters. Dassault Mystere 4B and 4N are being modified with a shibboleth for better control in the transonic regime.

Study on reliability of electronic equipment as all the military services used by the Defense Department showed the following rates of failure: tube failures, 67%; design errors, 15%; component failures, 10%; manpower maintenance and installation 7%; manufacturing errors, 3%.

North American Aviation has a USAF contract to develop an aircraft fuel measuring system using radioisotope techniques.

USAF reveals that the first experimental B-52 purchased cost more than \$20 million while first production model Stratofortress now being built at Boeing's Seattle plant will cost \$8.7 million each. B-52s to be built at Boeing's Wichita plant will cost \$15.7 million each for the initial inventory.

Largest British production program in a really modern jet aircraft has been in the Canberra twilight bomber, of which more 400 have been produced by three aircraft companies. In contrast, fewer than 100 Canberra Hunter fighters have been built to date.

Defense Reveals Scope of Missile Buildup

• Military programs \$4.7 billion since '51; Army takes wraps off Corporal, Honest John artillery weapons.

By G. J. McMillen

New official publications of the scope and direction of the guided missile program were revealed last week in testimony released by House Appropriations Committee.

If Congress approves Defense Department's fiscal 1955 request of \$635 million, the guided missile program will have received during the fiscal year 1951 through 1955 \$47 billion for research and development, production

and procurement, facilities expansion and testing. The amount is distributed approximately as follows:

- \$2.9 billion for procurement and production
- \$2.4 billion for research and development
- \$200 million for facilities expansion and testing.

Defense Department estimates that 5000 missiles will be expended in fiscal 1955 in the phase of the missile program.

New technical information and trends include:

• First photos and information on two Army surface-to-surface missiles — the Corporal missile and the Honest John artillery rocket. Both weapons are being delivered to troop units for acceptance.

• Marine Corps is spending \$953,000 to test control systems for a new guided missile system called LaCrosse which is to be used to provide close support for ground troops. Test program will involve the missile and two types of ground control equipment—one for operations when the target can be seen and the other when the target is invisible, and Lt. Col. Floyd M. Johnson,



HONEST JOHN is heavy field artillery rocket with mobility exceeding most conventional missiles. Fired from special truck which contains transport and launcher. Honest John is rugged, can carry almost as conventional warheads with equal ease. Diameter is 30 in.



LAUNCHER from test truck. Honest John takes off at super-sonic speed. Simple design of rocket makes for easy production and higher reliability. First large unguided rocket to be used by Army, it is aimed much like a gun.



CORPORAL, surface-to-surface missile, among latest additions to Army arsenal, is transported to launching site and



ERECTOR (above) by special vehicle to stand in face-mounted cradle above control flame deflector. Then Corporal missile is



SERVICED from mobile work platform at end of long-legged arm mounted on truck. Sailings protect crew as missile is checked.



AIMO LAUNCHER on 100-mi flight to target. Corporal was developed from Corporal X research rocket.

kind of USMC research and development.

Coop equipment costs about \$500,000 and first annual about \$380,000. The program was started by USMC in 1947 and is now under the control of Army Ordnance.

•Despite the Nike anti-aircraft missile in the move to Army's air defense problem, "missile with known carrier capability of today," were retired by Maj. Gen. John R. Tucker, Army research and development chief.

"We do not pretend that Nike can hold its as defense requirements. We know that it must be supplemented by other weapons to provide a weapons system to give resources air defense effectiveness." - Not all of our air defense can be in the bullet-missile "guided missiles," Gen. Tucker told those commentators.

An anti-aircraft campaign has been conducted on the Nike. Army plans to allocate about \$13.5 million in fiscal 1955 for anti-aircraft missile research and development, compared with an expenditure of about \$30 million in the current fiscal year.

•Sparrow missiles must now be installed by Navy to be sufficiently reliable for service use. Navy expects that it had controlled sufficient on external tests on Sparrow 1 to indicate that it was an effective air-to-air weapon and that it took less time to own pilots in the air of this missile than conventional aircraft weapons.

Navy said about weapons of the Sparrow also indicated progress in test on output.

•Air Force confirmed that it is developing present guidance system for developing launching operations to extend the capability of these aircraft to strike strongly defended targets. Ball B-51 Bunt is the only USAF missile of this type announced to date. USAF also is developing a completely automatic guidance system to provide future weapons systems for effective and economical attack on enemy strategic targets.

The Corporal

Components of the Corporal long-barreled missile include the missile, a mobile launcher and guidance equipment. The new Corporal does not differ greatly from the Corporal E as search weapon, except in ball features. The transpired that of its E model has been replaced with a new one in the fielded field surface. Vane provides into the jet exhaust of the rocket motor to provide control at low speeds of the missile take-off stage. It resembles the "World War II German V-2."

•Guided Firepower - The mobile launcher contains transport and launcher. It is equipped with a self-

Contract Change

Navy reports it is in the process of covering its guided missile contracts from cost plus fixed fee to a fixed-price contract. The Navy's Bureau of Ordnance awarded its largest single missile contract to a fixed-price contract late in 1953. Navy says the conversion in missile contracts is aimed at providing a definite incentive to industry to reduce costs and operate at maximum efficiency.

drawn blade for leveling the firing site. The launcher is a comparatively simple device consisting of a light metal table of polished. A hydraulically operated motor places the missile in firing position on the table's platform.

The missile is wheeled into an erect position while it is still clamped on the main launch table. A special track with a weak platform at the end of a hinged arm moves in for any last-minute servicing needs.

Corporal follows a definite trajectory as its flight. Weather and visibility place no restriction on its use. It travels at supersonic speed and is powered by a rocket motor. It is capable of engaging targets far beyond the range of conventional artillery, and may hit 250-mile, above ground, and the Hunter John rocket. Above or conventional type rockets can be utilized.

"The weapon gives the field commander the greater firepower, the battlefield and enables him to strike selected targets deep in the enemy's air area," the Army says.

Missile Policy

USAF guided missile program for fiscal 1954 and 1955 has been re-evaluated to coincide emphasis on research and development instead of production, Assistant Air Force Secretary Roger Levine says.

One guided missile program is finally determined. Levine told Congress, "effects an emphasis on research and development. In general, it was found that a great deal of costly technical studies and evaluations that some programs for which production had been planned were not yet ready for production and that production or firm placed on production should be deferred." Large production will be ordered as soon as the state of development and design warrants.

•Cal Tech Experiments - Development of the Corporal started in 1949 when the California Institute of Technology began experiments in the rocket propulsion of artillery major missile. Army Ordnance established a jet propulsion laboratory which was awarded under contract by Cal Tech.

A full-scale guided missile program was suggested which led to the development of the Corporal. Early guidance systems of the Corporal were the Proton, Private First Class and the WAC Corporal.

Corporal is now manufactured by the Flammable Tire and Rubber Co. and GEORGE H. R. RAY, Inc. The Corporal uses the mobile shell and GEORGE H. R. RAY, Inc. guidance equipment.

Honest John

Honest John is a long-flight rocket without guidance control. It consists of a rocket weighing several tons and a self-propelled launcher. The rocket itself is made up of a thrust compartment, a guidance compartment, a rocket motor in the middle and a fin assembly at the tail.

The wheeled pedestal and motor rest in assemblies set up together at the launch position. The rocket is fired and the pedestal is moved into the firing site. The rocket is aimed in such the rear motor as a gun is laid on a target. Manual cross aiming and standard fire control techniques are used.

•Mobility - It has considerable nose battlefield mobility than conventional artillery, and can high-explosive round deliver the effect of hundreds of artillery shells. Army says.

The proven line study to production moved rapidly for the Honest John. Army Ordnance first studied a large-order artillery rocket in May 1946. The Army Ordnance selected proposals based on Ordnance specifications, and five firing tests were completed at White Sands, N. M., in August 1951. Large-scale production by Douglas was started in January 1953.

Lockheed Pays Top Officers \$817,600

Robert E. Gross, president of Lockheed Aircraft Corp., received a salary of \$110,830 during 1953, the firm reports to Securities & Exchange Commission. Top executive salaries: C. C. Barber, top executive & treasurer, \$92,995; Cyril Chappetta, vice president, \$71,433; Corbin H. Goss, executive vice president, \$68,065; J. L. L. Hill, vice president, \$71,883; and H. B. Spang, vice president, \$62,170. All officers and directors averaged a total of \$817,607.

Atomic Attack

- Twining reports Russia has modern bombers.
- But Wilson claims Soviet could not penetrate U.S.

Shiny differences between Defense Secretary Charles E. Wilson and top Air Force officials on the vulnerability of the United States to Russian atomic attack, and on the reality of Soviet approval were revealed in congressional testimony.

Wilson and USAF leaders appeared before the House Appropriations Committee's Subcommittee on Armed Forces in support of the Defense Department bill 1955 appropriation bill.

•Ruth Gossard, Gen. Nathan F. Twining, USAF Chief of Staff, told the committee that Air Force intelligence indicated Russia's large force of long-range bombers is "now beginning to change over to non-dedicated long-range bomber types" thus the "40-45 percent of B-3's with which it has been equipped."

Twining said that, coupled with the Russian buildup of a medium and heavy bomber force capable of delivering atomic weapons against the United States, "the Soviet Union has created a large force of light jet bombers with a supporting atomic structure which adds additional risks to our interests in the European and Far East theaters."

"The Soviets have continued their great effort to build up an air defense system. They have completed replacement of piston fighters with jet fighters and are continuing to make improvements in their jet fighters."

•Sustained long-range - There has been a rapid expansion of early warning ground-controlled intercept radar coverage with improved search equipment. The USAF Chief and "On major importance has been the integration of the satellite air forces into an efficient or coordinated structure for the overall Soviet bloc air defense system."

In answer to a question from Rep. Clarence Cannon—"What is the speed of the fastest Russian plane capable of carrying an atom?"—Wilson replied: "250 mph, speed of the Tu-4, copied from the B-29."

Wilson later acknowledged that he thought it was a mistake to underestimate the quality of Russian equipment or pilots and he believed the Russians were working "on their research side pretty hard."

•Attack Query—Wilson told the congressmen he believed the U.S. air "not so vulnerable but not highly vulnerable" to

atomic attack. Wilson, who had been newly Russian bomber could get through the continental air defense system in U.S. targets, Wilson admitted. "We are going to appear before you tomorrow or tomorrow you want him, and he has a good analysis of the situation on how many we could stop. It could depend partly on what time of day they come." It would depend partly on how much warning we had and it would depend on whether they did it now or three years from now.

Cannon asked Wilson if he thought Russian bombers could penetrate U.S. air defenses.

"No, I would not say that. I would rather say that I do not expect the Russians to try it in the near future," Wilson replied.

Wilson testified that the very fact that the Russians continue to make both planes and atomic bombs and the very fact that you say we have an enemy number one bomber they might do it in any case at any time. He said that he did not think that is the conclusion to draw.

Cannon: "What is the conclusion, Mr. Secretary?"

Wilson: "That we are actually strong enough to deter aggression and the Russians are not going to start a war by dropping a bomb on us when they know there is a way to be caught and in some conditions. And we know we can greatly improve our warning system and our ability to stop bombs. If we can analyze the places the bombers would come from, how they would do it and when they have a target at night after hearing John. Rudolph's testimony."

"Can while you will not say that some of those Russian planes will reach their target, you think less of activation order than difficulty of getting through night prevent such an attack?"

Wilson: "Yes. They would have many bombers and trained crews and I do not think they could keep it up. It would be a terrible thing for our people to do this for weeks."

When Rudolph testified he answered the same question at the same time.

Gen. Twining and USAF Secretary (Rudolph) Twining later told the congressional committee that nothing had occurred to change the accuracy of the late Gen. Hoyt Vandenberg's statement two years ago that 70% of an attacking Russian bomber force could penetrate our air defenses and attack U.S. targets.

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Marquardt Builds New Jet Thrust Reverser

Van Nuys, Calif.—Marquardt Aircraft Co. this week announced its entry into the atomic thrust field with a variable exhaust jet engine. The company says it will provide a complete picture control of limited thrust independent of engine rpm.

The nozzle may be used in flight to increase range and endurance of aircraft engines, according to President Ray E. Marquardt. The new nozzle will provide up to 35% reverse thrust, the firm stated.

•Flying Spool—Unusual feature of the development is its forward thrust control. This will allow jet pilots to make landing approaches with nearly full engine power while using the device to slow forward thrust.

"Apprehensive men to handle with nearly full engine power with all forward thrust spool!" Marquardt says. "After landing the reverse can be activated and will slow down the aircraft in the event of an error in landing alignment, the pilot can go instantly from full reverse to full forward thrust and become airborne without delay."

•Flying Jet—The nozzle may be used to adjust exhaust area to meet requirements for maximum engine thrust on takeoff, regardless of ground temperatures, and to meet the requirements for water-jet and ramjet engines.

It also may be trimmed in flight to an area that will achieve the minimum specific fuel consumption for a given thrust requirement, the company reports.

Marquardt predicts this feature on long-range bombers will more than pay for the added weight of the nozzle in fuel burn. The nozzle weighs less than 100 lbs.

Initial application for the new device will be for non-distracting engines. It will be ready for test soon, the firm reports.

Comet Operators Face Replacement Problem

Second generation of de Havilland Comet jet transport has begun to show its age in the transport field from several quarters around the world.

Although confirmation was difficult, airline executives indicated to Aviation Week that British Overseas Airways Corp. is searching for long-range jetliners to fill the gap caused by withdrawal of its Comets.

A BACW spokesman said he had heard of no moves to pick up any equipment but added that it is "quite logical." He noted that the airline has sold its three-year-old South Atlantic service intermediate jets to the United States government and directed the Canadian government and wanted the Canadian government to have to find the aircraft already handled by the air services.

But for 377—Bogart that BACW might get Boeing Superfortresses from Northwest Airlines could not be considered. NWA aircraft based out of that Northwest only recently has added a third Stratocruiser transcontinental service to its domestic route and is getting ready to start a big new long-range jetliner campaign promoting 377 service. NWA also points out it will be unable to buy the first Super Comets are available and that replacement of its Stratocruisers will be difficult as to de Havilland's light transport market.

Australian airlines expressed some caution over orders for Comet 2 placed by British Commonwealth, British Airlines and Eastern European Airlines. The feeling there is that Australian carriers probably will need the additional 50 planes, possible Super Comets, to replace the Comets now on order.

► Postponed Comet Orders—From To-

low came word that Japan Air Lines is postponing delivery of its two Comets for two years.

A Royal Canadian Air Force source said Avrocan Wharfedale that it has not yet considered modification of its Comets, that the planes still are grounded. Whether the BACW planes will fly again after the modification program depends on conclusions reached in the United Kingdom, the spokesman added. He explained that BACW has not experienced any trouble like that in BACW's last two crashes.

Comet 2s shown—De Havilland has doubled Comet 2 production and ended overseas for modern jets at the plant at its Hatfield plant. The manufacturer apparently feels that there is not much point in spending Comet 2 output since such allocations might detract from their modification.

De Havilland also felt the impact of its difficulties with the Comet as a factor in its products. The delay possibly involved until recent trouble reported by DH Sea Vixens at flight and all Sea Vixens now have been grounded as a result of structural difficulties. Actually, only a few Navy fighters were involved.

The trouble centered around a wing defect which caused a small airframe crack to develop on the lower wing surface along side and aft of the inlets leading gear well. The failures on the Sea Vixens being now called into the shops and a modification made which enabled them to be returned to service. The hundreds of RAF Vixens fighter-bombers and all-weather fighters have not been grounded since they are restricted to routine operations below 10,000 ft until modified.

The retrospective modification calls for erecting a 16 in. x 12 in. plate over the lower plate. The change also is being incorporated in the production line.

Army Aircraft Buying To Double in 1955

Aviation purchases by the Army in fiscal 1955 will be double that of the previous fiscal year, Army officials told House members.

Army plans to spend \$60 million in fiscal 1955. Army denied that the accelerated procurement program means the establishment of an Army air force.

"There is no conflict between the Army situation of helicopters, which takes the total support of dollars in the aircraft program, and the needs of the Air Force or Navy Army has used the helicopters which is no new conflict with the Air Force use of helicopters," said Brig. Gen. Louis Caffery chief of operations, G-3 operations.

During the last six months of fiscal 1954 Army obligated \$87.5 million for aircraft.

► Groundplane—Most important development in Army aviation, according to Gen. A. W. Wells of Army's research and development staff is the combatplane (Aviation Week Feb. 15, p. 17).

It's a full winged, traditional and other elements tests have found some trouble, he added.

Col. Bitts also told the House Appropriations Committee that the Army plans to develop a new utility helicopter. "This will be very similar to the standard helicopter," he said, "to provide the Army with a satisfactory troop ambulance for moving the wounded."

► Army Bitts—Army also reported that its aerial delivery unit, capable of dropping a 28 ton truck as being delivered to troops.

"We are working on drop lifts going as high as 15,000 ft. The vehicles have not yet been tested, but they do require a rather extensive drop test program," Maj. Gen. Cavies, Army air staff and development chief said.

An National Guard official said they expect to have 377 liaison planes and 76 helicopters attached to ANG units by the end of fiscal 1955. They expect delivery of some 95 aircraft during fiscal 1955.

American, Capital, EAL Report Salaries

These salaries last week reported three executive salaries for 1953 to the Securities & Exchange Commission.

American C. R. Smith, president, received \$71,574; William J. Rogers, vice president, received \$47,000; and C. M. Mawer, vice president, only received \$41,625. All officers and directors were paid a total of \$551,805.

Eastern E. V. Richardson, board chairman and general manager, received \$50,700; Paul H. Bennett, first vice president, \$31,700. All officers and directors received a total of \$181,800.

Capital C. H. Casselberry, president, received \$48,000; R. G. Lusk, vice president and treasurer, \$30,000; and C. H. Macintosh, chairman of the board's executive committee, \$35,000.

Navy Blames Cutback On Engine Problems

Development problems with specific jet engine types forced Navy to reduce its fiscal 1955 aircraft procurement program for several fighter types and to curtail the quantity of transport, top Navy officials said today in the House Appropriations Committee.

James South, Assistant Secretary of the Navy for Air, and Rear Adm. Apollo Smock, Chief of the Bureau of Aeronautics, did not describe either the engine or the fighter aircraft involved in the shift but indicated the engine on transport will enable the Navy to order 1,455 planes during fiscal 1955 instead of 1,322 originally scheduled before the fighter program was curtailed.

► Modernization—Navy is scheduled to take delivery on 2,765 new aircraft during fiscal 1955 in contrast to 2,182 delivered during fiscal 1954.

Modernization of Naval Aviation is now about 95% complete, according to Vice Adm. Ralph O'Brien, Deputy Chief of Naval Operations for Air. Even after the completion of the current procurement program, Naval Aviation still will be only 67% modernized at the end of 1956 and will be short about 800 modern aircraft to achieve full modern status.

Other highlights of congressional testimony given by Navy officials in detail:

► Procurement of \$121 million worth of special order pilot aircraft for continued delivery.

► Modernization of one McDonnell-Douglas carrier and three additional F4U-Carrier carriers with turbojet engines.

► Equipment of structural carrier with new fuel loading device enabling carrier-based Navy jet aircraft to use changes get fuel instead of high-octane jet fuel stored on carriers because of jet fuel capacity requirements.

► Average cost of Naval aircraft will rise from \$814,493 in fiscal 1954 to \$1,282,720 in fiscal 1955.

► Air Program—The following program has been described as the least likely at which Naval Aviation will be modernized by the Department of Defense:

- 25 carrier air groups
- 15 carrier-based fighter groups
- 13 Marine air units

In addition, both Navy and Marine

will maintain the necessary aircraft to support operations of these combat forces.

ACC Opposes Closing 31 AirNav Ranges

Retention of 31 of the 55 low-frequency navigation radio ranges proposed for decommissioning was recommended last week by Air Commanding Committee.

Retention by the Air Force Subcommittee was due to "significant civil or military requirements," ACC said.

► CAA Deletion—The decommissioning program was established by Civil Aeronautics Administration in October 1953 (Aviation Week Nov. 10, p. 14). The program was to be based on the elimination of the non-directional airway system. The Air Force Subcommittee took that because of the general lack of VOR/OMR release equipment, only 32 of the 55 low-frequency ranges could be shut out without seriously impacting the system.

ACC is continuing to study two other facilities included in the 55 proposal. There are 350 low-frequency ranges operating in the U.S., and final decision on the closing of specific ranges will be made by CAA.

► New Modernization—ACC is rejecting proposals to decommission about 13 more low-frequency ranges.

Ranges recommended by the Air Force Subcommittee for decommissioning are: Bane-Morehead, W. V.; Douglas, Ariz.; Garland, N. M.; Burlington, Iowa; Fairfield, Utah; Evansville, Ind.; Monroe, La.; Joplin, Mo.; Combs, Ark.; Alton, Ill.; Kankakee, Ill.; Camp Hill, Pa.; Coalinga, Calif.; Fort Ord, Calif.; Wickenburg, S. D.; Lincoln, Tex.; Wilmar, Minn.; Walnut Ridge, Ark.; St. Joseph, Mo.; Colorado Springs, Colo.; Thermal, Calif.; Salinas, Calif.; and Radio, N. M.

USAF Equipment Program

(Fiscal 1955-1959)

(In millions)

	Fiscal 1955 obligations	Fiscal 1956 obligations	Fiscal 1957 obligations
Complete aircraft	58,236	52,499	52,368
Initial aircraft equipment			
spare and parts	1,756	1,736	8,937
Related aircraft procurement	645.7	549.1	252.0
The includes:			
(A) Individual machines,	895.1	276.0	87.0
equipment, facilities	49.5	14.9	18.0
(B) Training costs			
(C) Aircraft ground handling	189.2	183.3	65.0
equipment	128.5	178.7	114.0
(D) Dependence on	67.8	145.4	40.0
Modification of existing aircraft			
and component equipment	217.6	371.8	136.0
Costed, material	245.6	678.4	470.0
The includes:			
(A) Ground facilities, complete	862.8	574.2	308.4
(B) Initial component spare and	140	25.8	23.6
(C) Production planning and	15.0	128.5	61.0
facilities			
(D) Modification and modernization			
costs			
(E) Auxiliary equipment	14.0	133.5	71.4
(F) General aircraft targets	36.9	2.8	
Industrial acquisition	5.97	13.4	15.0
The includes:			
(A) Reserve plants	1.22	2.99	3.44
(B) Reserve machine tools and			
production equipment	2.26	7.95	8.99
(C) Industrial preparation program	1.79	2.04	2.8
(D) Modernization program	699	718	661
Procurement and production administration	65.2	61.0	60.9
Total, aircraft and related procurement	98,281	85,381	54,805



New Generation of Fighters Joins RAF

Indication of new British jet-powered wing fighters that are beginning to go to Royal Air Force is that first group of the Supermarine Swift 58. In line up at the company's Chesham Aerodrome plans to de-

velop. It has been revealed officially that the Swift's standard maximum consists of 10-mm. Avon engines. A photo-reconnaissance version of the British fighter also has been developed.

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Antenna Structure
of F10D

Military Construction Bill: \$896.9 Million

Authorizations request for construction totaling \$896,936,000 at Air Force, Navy and Army bases now is before Congress.

Hearings already have started before the House Armed Services Committee, and Senate Committee will start hearings soon.

Air Force received the largest share of the new authorization—\$311,343,300 for construction at 31 S. bases, \$120,325,000 for aircraft control and warning systems and \$9,518,000 for outer space construction. This is in addition to previously authorized USAF construction of \$578,695,000, which has been appropriated.

■ **Fiscal Request News—**Identified inter-service bills were introduced by Rep. Dewey Short, chairman of the House Armed Services Committee, and Sen. Lawrence Schweickart, chairman of the Senate Armed Services Committee. An appropriation bill for fiscal 1955 construction will be submitted to Congress soon.

Navy aviation construction request was more than \$70 million.

Air Force authorization request, by commands, include:

■ **Headquarters Air Command—**Albany, N.Y. \$14,511,000 aircraft personnel fuel storage construction and airfield maintenance.

Albany AFM OMA. \$14,511,000, aircraft personnel, fuel storage, communications, airfield maintenance and airfield lighting facilities.

Albany AFM, Tex. \$14,511,000, aircraft personnel, fuel storage, communications and airfield maintenance.

Chickadee AFM, Tex. \$14,511,000, aircraft personnel, fuel storage, communications and airfield maintenance.

Goodall AFM, Calif. \$14,511,000, aircraft personnel, fuel storage, communications and airfield maintenance.

Griffith AFM, Ind. \$14,511,000, aircraft personnel, fuel storage, communications and airfield maintenance.

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NEWS SIDELIGHTS

Here are some statistics Boeing has released on its 707 prototype jet transport: number of rivets and fasteners in the prototype, 415,000; pounds of steel used for seating, 475,000; lumber used in mockup, 33,000; board feet of plywood, 33,000; square feet of plywood, 33,000; square feet of aluminum, 33,000; and square feet of steel, 33,000.

J. G. Brown, director of the aerospace department at North American Aviation's Santa Monica facility, asserts that NAA now leads the nation in the large rocket engine field and is rapidly achieving the same position in the field of small rockets.

Residents in the vicinity of San Fernando Valley Airport at Van Nuys, Calif., have filed suit against Lockheed Aircraft Corp., charging that operation of the airport is a nuisance and a threat to their property. The suit alleges that property values have depreciated due to "loud and obnoxious noise" from aircraft which cause houses to "vibrate, shake and pit." Some 55 families joined in the action, which adds \$14-million damages if the company does not cease operations. An attorney for the group says a separate suit against the city will be filed to halt firing activities at the field other than Lockheed's. Airport was scene of a public protest last year after a Lockheed T-33 crashed into a residential area on the vicinity of the field. Lockheed moves its T-33 operations to Palmdale next month and is during its Graded Missile Division to Van Nuys.

A 100-foot hangar is indispensable on farms adjoining South Africa's famous Kruger National Park. U. G. Campbell, a farmer, says he has had to build one on his airport because lions live to hunt expensive visitors in the form of ripping felines and business plane tires. Recently, he reports, lions became enraged when they couldn't get into the hangar, chewed up parts and shook windows outside.

Headwick Aircraft Co., Rossmore, Calif., has purchased what is claimed to be the first privately owned jet aircraft in the U. S.—a surplus Bell P-59A, powered by two GE J45s.

A helicopter pilot just recently revealed was the unusual sight of 6,000 Indian troops from aircraft carriers to the aerial sea in Korea following curfew of hostilities. During the strike, larger in proper history according to United Aircraft Corp., a Lockheed S-55-type left a center deck every two and a half minutes.

Casualty, Calif., Mountaintop, actively engaged in guided missile development as well as plane building, has made its first successful missile launching from its 800 Sabin jet fighter.

Secretary of Air Force Harold Talbot told West Coast newsmen late last month that since the end of the Korean War the Air Force has found it necessary and economical to cut back certain defense programs, but "I do not see anything but sustained production in local (West Coast) plants the balance of the year."

Top Tips is a new cross-country travel service inaugurated by Aero Club International, Inc., Aero Club, Mich., available free to members of Aero Club of Michigan and National Aero Club who carry airline insurance with the firm. Pilot planning a cross-country flight can obtain information on suggested stopping, cross-country airports and air service operators, both in Canada, restaurants and points of interest. Data also is available on Japan to Canada, Alaska, Mexico, Cuba and the Bahamas.

Pittsburgh Pirates this year will be the first Big League baseball team to use an inoperative plane in full in its season's schedule. Capital Airlines will carry the team on 20 trips totaling 18,135 air miles. Longest legs: 888 miles New York-St. Louis.

Glenn L. Martin, the pioneer plane builder, took a look at the radical Boeing "Vigilant" airplane (Vigilant, Vol. 3, p. 17) at Orange County Airport, Santa Ana, Calif., during his visit to the West Coast last month.



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\$209-Million Aid Program

The Administration's plan for a \$209-million foreign aid program of aircraft and related material in fiscal 1955 is less than half this year's \$447-million program. As FASA will administer \$265.6 million and Naval Aviation \$61.7 million. Details of aircraft and related foreign aid, disclosed by Maj. Gen. George C. Stewart, director of the Office of Military Assistance, in testimony before the House Foreign Affairs Committee.

	Air Force		Navy		Proposed FY 1955 program		
	FY 1954 program	FY 1954 program	FY 1954 program	FY 1954 program	FY 1954 program	FY 1954 program	
	Planned	Planned	Planned	Planned	Planned	Planned	
Dry lighter							
Conventional	279	1,365	485	\$204,701,500	165	\$38,124,000	
Jet	—	—	—	—	—	—	
All weather	—	—	172	120	45,494,500	225	\$1,577,000
Jet	—	—	—	—	—	—	
Fighter bomber	—	—	—	—	—	—	
Conventional	827	56	38	11,670,600	32	6,309,400	
Jet	1,852	1,962	179	61,115,800	—	—	
Reconnaissance	—	—	—	—	—	—	
Conventional	38	4	2	470,000	—	—	
Jet	—	—	—	—	—	—	
Reconnaissance	181	92	37	2,580,000	15	16,320,800	
Transport-conventional	301	114	73	12,121,700	28	2,173,800	
Trainer	—	—	—	—	—	—	
Conventional	441	268	17	131,800	—	—	
Jet	229	362	16	2,077,200	18	1,246,200	
Other aircraft	37	131	76	2,115,200	7	—	
Intercomms & equip	—	—	—	111,600,700	—	26,345,400	
Total	4,121	4,959	1,314	\$170,817,900	393	\$85,441,200	

	Air Force		Navy		Proposed FY 1955 program	
	FY 1954 program	FY 1954 program	FY 1954 program	FY 1954 program	FY 1954 program	FY 1954 program
	Planned	Planned	Planned	Planned	Planned	Planned
Fighter						
Carrier board	362	215	113	\$18,070,800	—	—
Bombard & patrol, C-1	479	158	—	—	—	—
Maritime patrol	112	37	39	91,686,200	15	\$14,737,000
Other aircraft	168	37	14	14,007,600	17	1,137,000
Other aircraft	—	—	—	11,360,600	—	4,967,200
Total	1,059	450	116	\$77,842,400	29	\$18,762,800
Grand total USAF and Navy	5,180	5,409	1,430	\$247,270,900	422	\$104,204,000

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America's Leading Airline **AMERICAN AIRLINES** INC.

AVIATION WEEK, April 26, 1954

39

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MULTIPLE EXPOSURE photo shows XP-11 flying through function flow within itself in horizontal flight in NACA tunnel.

NACA Tunnel

• Studies indicate no unusual stability problems with jet power; pulsejets, ducted fans, look good.

By Robert Hottel

New approaches to the problems of developing vertical-lift aircraft are being explored by the National Advisory Committee for Aeronautics. These approaches include the use of ducted fans and pulsejet power and cruise-type wings.

NACA has been doing basic research on the VTO field for more than a decade and laid the foundation for the development by Lockheed and Convair of the VTO prototypes powered by Allison turbojets that now are being studied for actual flight tests (AVIATION WEEK Feb. 15, p. 15, Mar. 22, p. 14; Mar. 29, p. 14).

• **VTO Power.** Development work on the Lockheed XP-11 was done at Ames Laboratory in California but most of NACA's research work on VTO has been done at the Langley Laboratory where development work was also conducted on the Convair XP-11.

NACA's VTO research team is headed by Charles H. Zimmerman, assistant chief of Stability Research Division at Langley, working with John F.



QUARTER-SCALE MODEL of Lockheed XP-11 being studied for free flight in wind's large windward at NACA Ames Lab., California. Most of the convair's VTO research work has been done at Langley.



STRAIGHT-WING VTO research model used by NACA in basic stability characteristics during horizontal flight.

Tests Give Answers to VTO Problems

Campbell, chief of the Langley free flight tunnel, and his assistant, Milton O. McKenney. Zimmerman is a pioneer at the VTO field who worked with NACA prior to 1937 and then spent 31 years with the Chance Vought Division of United Aircraft when he designed the XP-11, a Navy carrier-based fighter prototype, approaching VTO characteristics. Zimmerman returned by NACA in 1948 after the XP-11 project was abandoned by the Navy.

A simple ducted fan, known at Langley as the "Flying Barrel," has been used successfully for initial exploration of stability and control problems of a jet-powered vertical lift.

The test device consists of a barrel-type structure 18 in. in diameter with a jet of dual-nozzle propellers driven by an electric motor

mounted at the nose and a set of cruise-form controls mounted in the tail where they are in the jet blast.

• **Jet Power.** Powering experiments with the Flying Barrel have indicated that no unusual stability problems should be encountered in vertical takeoff or hovering flight with jet-powered types. Further experiments are now in progress with various types of jet and turbo added to the ducted fan powerplant. Other models will be tested, powered by a VTO thrust pulsejet developed by American Helicopter Co. for jet-propellers.

The ducted fan and jet-powered approach to VTO appears more promising than the turbojet-powered prototypes now in existence, because of the ability to give higher performance in level flight.

It is generally accepted that the turbojet VTOs will never be better than second-line fighters in the military stable. With jet power, VTO types with a level flight capability of Mach 2 are not deemed impossible.

• **Transport Use Possible.** Another approach being explored by NACA is the cruise-type wing, which aims at avoiding the problems of upright engine and propeller installations by turning up 30 deg. over the wing to provide vertical lift. NACA has been exploring stability and control problems of this type VTO for some time (AVIATION WEEK May 15, 1951, p. 16). Some people familiar with these experiments feel they may eventually have considerable commercial application to transport aircraft when routine transport cruising speeds



SCALE MODEL of Convair XP-11 VTO prototype is studied for free flight in full-scale windward at NACA Langley Laboratory. Tunnel drive line is visible in background. Remote-control pilot operates behind screen in foreground.



FRONT of Flying Barrel shows ducted fan using dual prop.



REAR shows cruise controls mounted in jet stream.



Vibration-proof :: fasteners for joints with heavy structural responsibility

Design of the Fairchild 364 jet engine for pilotless aircraft placed a tremendous responsibility on two bolted joints. A short metal coil forming the pressure chamber also serves as the load-carrying bracket. Two end plates bolted to the coil support the main bearings . . . and these bolted joints hold the entire compressor structure together. They must withstand the severe shock of parachute recovery as well as the normal stresses of flight.

ELASTIC STOP® nuts were called out by Fairchild for both joints. At the high temperature end, ESN's all-steel, high-strength, hex-type nuts are used. The joint at the compressor intake end is held by ELASTIC STOP nuts with the familiar and most locking collar. All are vibration-proof and self-locking. Assembly is a quick, simple operation.

In all testing and field experience with the 364, Fairchild has not experienced a single failure due to the loosening of an ELASTIC STOP nut.

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cost into a safe glide or otherwise bring the engine down safely."

■ **Quick Inflation:** The parachute is capable of inflation almost instantaneously upon release from the airplane and is adapted to inflate the airplane at a sufficiently low sinking speed to prevent serious injury to the airplane and pilot under most conditions of operation.

Patent was filed May 12, 1953, when development of a VTO was first undertaken by Lockheed. Patent rights have been assigned to the aircraft company by the inventor.

No Harm in Pressure Loss, Doctor Says

Physical discomfort caused by sudden loss of pressurization at 25,000 ft. is "comparatively innocuous," Dr. Charles Benson, Lockheed Aircraft Corp. flight surgeon, told the Aero Medical Association recently.

He also reported that as a result of continuous decompression experiments conducted thus far at Lockheed, a major step has been taken in future tests to check problems encountered in flight and problems flying at 40,000 ft. and upwards.

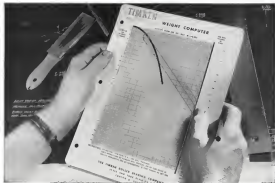
■ **Altitude Tests—**Explosive decompression tests to 25,000-ft. simulated altitude have been conducted at Lockheed since January 1951. They involved 181 exposures ranging from 20 to 35 years of age, who underwent the exposures under carefully controlled conditions while sitting in an "altitude" chamber.

While the subjects were in the chamber at a simulated 8,000-ft. altitude, a disphragm was clamped and air expelled into a partial vacuum as an adjusting chamber, causing the subject to breathe compressed, humidified air at 20,000-25,000 ft. The switch in pressure was accompanied by a thunderous clap of noise, blast of wind, and split-second blast of wind and fog.

Other highlights of the experiment: ■ Majority of passengers tested were in their 30s, but total results indicate that controlled explosive decompression can be taken safely by persons up to at least 55.

■ About 26% of the participants had a physical defect, such as varicose veins, hypertension, overweight, reduced lung capacity, heart trouble, hernia or bony spine. Several had multiple defects but reacted usually to them without defects.

■ Complaints about the lungs were negligible, since tests were helped appreciably. Temporary ear complaints in two cases were the most severe reactions noted. Gastro-intestinal tract complaints were relatively few and only two persons noted any dental pain.



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THREE ANGLES—THROUGH EXPERIENCE AND RESEARCH



SPECIALISTS IN FINE ALLOY STEEL, GRAPHITIC TOOL STEELS AND SEAMLESS TUBING



HEAT-RESISTANCE to jet engine heat (TH, MT and SOUT) temperatures needed in nozzles (right) may soon be achieved as...

Ryan Develops Ceramic-Liner Techniques

• New ways to apply and work with coatings point to solution of some high-heat powerplant problems.

The role of ceramic and new of ceramic-a combination of ceramic and metallic powder-grows increasingly important in the development of more efficient components for the hot end of jet and rocket engines.

Therefore it is natural that these materials should play a big part in the research and production activities of Ryan Aeronautical Co., a pioneer in aircraft engine work. Recent Ryan developments tell of company developments in this field. They involve:

- Flame-spraying of ceramic on metal;
- Ceramic coating of large, flame-sprayed jet engine components;
- Working through ceramic coatings;
- Flame Spray Process—flame-spraying is still in the research category. In this operation, a powdered refractory is mechanically applied, then sprayed on a metal surface. Ryan says a gun that was designed for metal spray welding work but converted for the application of ceramic.

As coatings for efficiency liners, nozzle parts, and other high-heat components, flame-sprayed ceramic offers promising possibilities. These parts must

withstand high velocity, high-temperature ceramic gases, but are not required to possess high structural strength. Service life of these parts may be extended appreciably with ceramic coatings successfully applied.

Naval-Magnetics Co.—Nobel Engineering, a pioneering concern, has been flame-sprayed successfully at Ryan on stainless steel, Inconel and other high-temperature alloys. As a coating, nickel-nickel alloy will withstand temperatures as high as 1,700°F for limited periods.

The material is made from nickel

and magnesium oxide which have been condensed, oxidized and ground to a powder. It has a very high fusing temperature and cannot be applied to metal structures by ordinary furnace fusing methods, Ryan reports. Ordinary fusing will not provide temperatures above 2,100°F. Specially modified furnaces are expensive, difficult to design and operate for handling metal parts.

Another difficulty is that jet engine alloys cannot take the necessary firing temperatures without losing strength



RYAN AFTERBURNERS, like those for the PT, operate temperatures to 3,500°F.

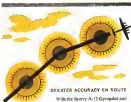
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selects Sperry Gyroplot with New Radio Beam Coupler



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With the Sperry A-12 Gyroplot and Radio Beam Coupler, accurate, economy flying is substantially accurate and greatly simplified. Compensation for cross winds is made automatically and the pilot gets a continuous indication of drift angle. It provides a constant flight over such dead-end routes. Upon entering this area, the Coupler automatically demagnetizes itself and the previous magnetizing is made good. Once passed the area where the radio beams are radiating, the Coupler automatically re-magnetizes itself and the correct continues on its track.

SPERRY



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Seven years ago, United Air Lines pioneered routes and new arrival approaches by installing the Sperry A-12 Gyroplot Radio Control and approach coupler on its fleet of DC-4s. It was, as the words of United Air Lines President, W. A. Patterson, "...a definite step in developing modern air travel and the aviation. Today, United Air Lines is still leading the way. With its entire fleet of DC-4s equipped with Sperry A-12 Gyroplots and new Radio Beam Couplers—United Air Lines plans to make its entire automatic flight on the Victor Airways along the coast route.

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The A-12 Gyroplot with the new Radio Beam Coupler instantly opens for itself the entire field of automatic flight. Straight, level, constant course from time saved and fuel consumption. More precise approach, more direct routes, freedom of weather. The Gyroplot is now in production and the A-12 Gyroplot can be produced with this new feature. It can also be added to existing A-12 installations. One master flight will be happy to give you complete details.

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THIN-WALLED structures get high temperature coatings without warping.

and increasing other physical changes.

Flame-spraying gets around these obstacles, Ryan says. It heats the contact to the fusing point without heating the base metal, to which it is applied, close to hundred high temperatures. Equipment for flame spraying also is designed.

The metal exposure powder is placed in a metal container attached to the flame-spraying gun. The powder is forced through a tube into the hot torch made by spraying gas. Oxygen and acetylene also are piped to the nozzle, where they burn at a temperature of 5,500°F. The current liquefies as it flows through the hot flame and is sprayed on the metal surface. Improving on the earlier method, the temperature of the current drops, the material solidifies and adheres in a coating which can be applied to a required thickness.

Ryan has put on the coating in thicknesses ranging from less than .001 in. up to .020 in. The base metal is not brought to a temperature which could cause it to warp or buckle.

The spray gun is light and depends on air, Ryan says. Four valves control the flow of oxygen, acetylene, nitrogen and the current powder.

Afterburner Linco-Ryan, in conjunction with California Metal Finishing Co., is producing large General Electric afterburner liners. These liners and discharge structures shield the afterburner walls from the flaming jet stream. If they were not coated on both sides with a ceramic shell, they would not stand up in service. Linco-Ryan engineers check every strength and condition.

In service, the liners extend afterburner life by maintaining a relatively cool boundary layer of gas along the afterburner walls.

The A-108 ceramic coating, the most recent National Bureau of Standards

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CERNUCCI are spread the joint on stainless steel parts with 3,000° gas

type, protects the base from the rapid oxidation to which it usually would be subjected.

Ryan says that exceptional methods had to be developed to obtain uniform coatings on the corrugated surfaces. Special cleaning methods also had to be developed, since standard sandblasting procedures could not be used because of the thin pipe material involved. Techniques were evolved to prevent warpage of the thin sections during the furnace heating process.

Welding Through Corrosion—Ryan reveals that because the A-415 ceramic coatings are fusible in character, it is possible to arc weld through them with good results. In Ryan's production plant, the large structures involved are built in small component parts, then welded after they have been contaminated. This simplifies the coating process, Ryan says, and allows repairs, since the parts are most accessible.

The ceramic coating melts, fuses on the weld metal and coalesces with the welding flux along the weld across the adjacent ceramic material, usually fusing itself into the weld without spilling, Ryan says, because of the good thermal characteristics of the coating.

Link Setup-Ryan's development laboratory constantly evaluates ceramic materials. The test setup uses an air-tight furnace having high-oxygen flow at test headon coated with the ceramic under test. Furnace temperature is 1,200°F and the ceramic is heated to a 1,700°F skin temperature for 25 hr.

In comparative tests, the A-415 ceramic coatings have displayed less physical change due to temperature than any other tested, Ryan says.

Another function of the Ryan laboratory is to aid production by determining the proper thickness for coating parts, and to ascertain, for example, how many forgings are desirable.

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Colonel John H. Brown, pilot of first aircraft to be received by the Strategic Air Command, stands by Major General Walter C. Sawyer, Jr., Fifth Air Force Commander (right), and Major General Robert H. York (left), Fifth Air Force Deputy Commander. This was the first B-47 to be received by the Strategic Air Command.

Parker Develops New Flight Fueling Unit

Parker Aircraft Co., Los Angeles, has completed preliminary design work on a new probe-and-drague refueling retreating cylinder.

Parker's system has a new type of coupling to permit high flow rates, and a new type of basic tension-control mechanism employing stored hydraulic energy. As the basic aircraft leaves its alignment drag on the cone-shaped device, energy generated by the action is stored in an accumulator. The energy is released as needed to tension the hose.

The company points out that its tension-control system makes no demand on the plane's electrical system. This is an especial advantage when fuel is being pumped at a high rate and there is a high power demand on the electrical system.

Military Sets Specs For Titanium Bolts

First proposed military specifications for titanium alloy screws and bolts are being circulated in industry by Navy Bureau of Aeronautics.

Strength requirements are identical to the requirements called for in Naval Aircraft Standard 454 for steel bolts. Chemical composition is the same as MIL-1318. The proposed open function has been approved by Air Force and Army.

Research Contracts—Bureau of the specifications is a major step in Baker's titanium fastener program that started in early 1951 with the awarding of two research contracts—one to Rensel (Burlington, N. Y.) to investigate cold heading techniques, and the other to H. M. Harper Co., Monroe, Conn., Ill., to check hot heading techniques.

Results of the investigations were distributed to both firms to speed development of the fastener program.

Harve S. Bowers, a standards expert in the Baker's Aerospace Equipment Division, says the aircraft industry is interested in making titanium fasteners.

■ **New Alloys, Castings**—"We estimate that about 1% of an aircraft's dead weight is made up of titanium—bolts, screws, nuts and washers," Bowers says. "Titanium will produce about a 45% weight savings in fasteners alone in a 20,000 lb. aircraft that means a saving of 200 lb."

The titanium fastener problem has been approached by Baker in three ways:

■ First is the titanium fastener which is current working bolts. Com-

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proboscis fatigue tests now are well along at the Naval Air Engineering Station in Philadelphia.

- Second segment is the after fairman.
- This portion has outlined the steps of the proposed specification.
- Third segment is assurance features such as rivets and lock bolts. Initial testing of this phase of the program has resulted in NAES.

First two segments concern threaded bolts.

Future investigation is guided by the principle of adapting the feature to the actual aircraft use.

The National Aircraft Standards Committee is following the program.

NAES will schedule a thirteen-business session from June 14 to New York, just prior to the national NASC meeting.

Navy Contracts

Contracts recently announced by the Navy's Aviation Supply Office, 790 Robinson Ave., Philadelphia 11, are:

- Adm. Div., General Supply Corp.**, 1077 Van Orman St., Philadelphia 40, value \$100,000, 101-271.
- Aviation Div.,** 4411 25th St., Philadelphia 19, Los Angeles 41, Calif., contract \$100,000, 101-271.
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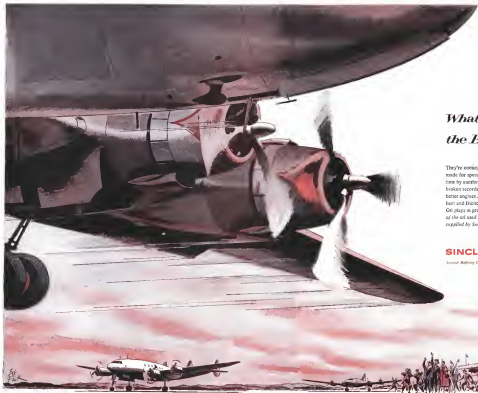
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WHAT'S NEW

New Publications

Functions of Flight—Aircraft History in Paintings is an attractive slide paper brochure containing black-and-white reproductions of 191 airplane paintings by Charles H. Heibell that have appeared in *Thompson Products* calendar since 1899. Thompson Products, Inc., Advertising Dept., 2209 Ashland Rd., Cleveland 3, Ohio.

Kentucky's Dept. of Aeronautics has put out a 1994 Aeronautical Chart showing the state's facilities. Map is available free from Dept. of Aeronautics, 922 State Office Bldg., Frankfort, Ky.

Design Considerations of a Submarine Servomechanism is a 16-page publication describing synthesis of the general principles underlying multiple-mode control of servomechanisms. F.E. Kendall and F. Marquis are the authors. The booklet is free. Ask Goli Research Laboratories, 7550 Montclair Ave., Skokie, Ill., for Bulletin R13.

New 24-page booklet describes an analysis of the *Turbidity of Randomized Equipment*. Hapshausen, Send copies to Dr. George D. Whitman, General Manager, Institute of Environmental Equipment Manufacturers, 30 Church St., New York 7, N.Y.

DYNAMIC MEASUREMENT is 33 mm. 16 mm. sound motion picture in color that tells the story of "electronic yard sticks" in science, industry and medicine. It is available for showing to engineering, industrial and scientific groups. Contact Public Relations Dept., Consolidated Engineering Corp., 306 N. Santa Maria Villa, Pasadena 15, Calif.

Telling the Market

Catalog and engineering manual (28 pp.) on *Produce* brochure for developing aerial charts is available from Smith Mfg. Co.'s Aerials Production Div., 59 Mill St., Waltham 20, Mass. Rogers Machine & Tool Works has put out a 28-page bulletin, No. 57A, on the Series AA Open Back Indestructible Process, Address: 681 Northland Ave., Buffalo 11, N.Y. New automatic turret lathe, Model 423, is described in Foster & Johnson's *Design* Bulletin 171. Company's address is Pinckney, N.J. Form Free Production describes in question and answer form basic information about packaging and chemical waste regulations.

made by Natural Foam Systems, Inc., West Chester, Pa. ... *Formulation* and properties of Bubblelite (polyester resin) and their use in manufacturing of scintillated plastic structures are described in 15-page booklet issued by Bubblelite Co., 210 Madison Ave., New York 17, N.Y. Manning, Maswell & Maswell's new 12-page *Adhesive* Catalog is said by the company to be the most comprehensive catalog ever issued on pressure pipes, adhesives and engineering information, available from the company's distribution or its plant in Stamford, Conn.

Design engineers' bulletin on stabilizing methods is first of a series to be put out by Metall Form Tech, Civil Edin Co., 31275 Avenue Rd., Solon, Ohio. ... *Technical* booklet on engineering properties of 5 Mil steel casting alloy is available from Technical Service Section, International Nickel Co.'s Development and Research Div., 67 Wall St., New York 5, N.Y. Rogers Machine Works, Bulletin 655 is about the company's Perfect 35 vertical turret mills. Address: 1406 Secor St., Buffalo 16, N.Y. ... *Harris* Forming Machine Co., Union River Bldg., Pittsburgh, Pa., is offering the trade its 24-page *Truing, Let's Look at the Human Line of Molding Machines*. Complete line of reprint for mechanization of firms and conferences brochures is detailed in 40-page book put out by Lin-Bolt Co., 187 N. Main Ave., Chicago 1, Ill.

Publications Received

- *History of American Industrial Science* by Courtney R. Hill—pub. by Library Publishers, 1 W. 4th St., New York 18, N.Y. \$4.95, 400 pp. Study of American industry, including aviation, in terms of one national defense and the protection of the world's peace and political development.
- *Tables of Correlation and Dependence* Statistics and Correlation Analysis—National Bureau of Standards Applied Mathematics Series 54 (Series of Mathematics Table 5)—Order from Government Printing Office, Washington 25—407 pp. 33.
- *The Franklin Story* by Alfred East—pub. by McGraw-Hill Book Co., Inc. 310 West 42nd St., New York 36, N.Y. \$1.50, 407 pp. Account of a modern in detail, including a review through 50 years of American history.
- *Annual Year Book for 1951*—published by Lincoln Press, Inc., Washington, 55.
- *Booklet Propaganda by Life*—published by Chapman & Hall Ltd., 37 Essex St. W.C. 1, London, Eng.—distributed by Meredith Co., 65 10th Ave., New York 11, N.Y. \$4.95, 215 pp. Second edition. Principles of nuclear propaganda.
- *Jet Aircraft Handbook* by Charles E. East—Copyrighted by Aero Jet Publications, Inc., Los Angeles 44. \$1.75 (hard cover) and \$1.75 (paper cover). 176 pages. Basic principles, practical application and development of jet propulsion for aircraft.



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AVIONICS

Navarho: 50 Stations Can Cover Globe

• Long-range nav system gives bearing and distance instantly; may become international standard

By Philip Klein

Attention is focused on the new Navarho long-distance navigation system, which provides VOR-type bearing and DME-type distance information instantly and automatically at distances up to 2,600 nautical miles. Despite its operation in the low-frequency (90-115 kc) region, Navarho is relatively unaffected by static and thunderstorm interference.

Interest here and abroad stems from a recent official U.S. policy statement by the Air Coordinating Committee recommending further development and evaluation of Navarho as a possible future international standard (Aeronautics Week, Apr. 5, p. 20).

A Navarho station, located at a single site, can serve an area of 12.70 million square miles, and 50 such stations could more than blanket the earth. By contrast, 450 short-range VORs are needed to cover the U.S.

• **Navarho Plus.** Rio-Rio—The USAF sponsored Navarho development in a system called Navarho, which provides bearing information only (Aeronautics Week, Aug. 17, 1955, p. 268). It was conceived and developed, beginning in 1946, by Robert Telemanian, chief of the Division of International Telephone & Telegraph Corp. Later the idea of combining a novel type of distance-measuring equipment (Rho) with Navarho was conceived and tried experimentally.

First official testing of Navarho and the Rho portions into a working Navarho system will probably take place late next year or early in 1958 at a site near the Rome Air Development Center (Rome, N.Y.). RADAC has an experimental Navarho test facility at Adairton, N.J., and one at Fort Monmouth, N.Y.

• **Navarho Performance.** Based on the strength of light and life tests to date, MTC's Air Traffic Control and Navigation Panel says it expects to achieve the following from the new system:

- Operating range: 2,000 nautical miles over land, probably 2,600 n.m. over water.
- Bearing error: ± 1 degree at 2,000 n.m.



NAVARHO STATION SITE consists of three stations located at apex of a triangle, approximately 4,000 ft. apart. Station provides both VOR-type bearing and DME-type distance information at ranges up to 2,600 nautical miles.



ORIGINAL NAVAGLOR system based of the new Navarho, was tested at Adairton, N.J.

- Distance error: 1% of distance to station.
- Airborne equipment weight: 50 lb. for a set providing VOR/DME type information, 70 lb. with computer which provides pilot with continuous solution of his present latitude and longitude.
- Airborne equipment size: 3 cu. ft. for 1 cu. ft. with computer.

- Airborne equipment price: \$1,500 for base set, \$4,500 with computer.
- The estimated weight, size, and price are lower than corresponding figures for an airborne VOR and DME.
- No threat to VOR/DME—At first glance, a comparison of Navarho and VOR/DME performance (range: 9.3 deg. vs. 15 deg.; distance: 1.8 vs. 25.5) might imply that the new system is at



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SIMULATED Navstar pulses, four per epoch, are repeated once a second.

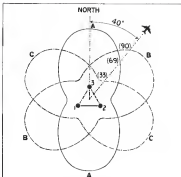
threat to existing short-range nav-aids. However, when the angular bearing and percentage distance errors are translated into an actual position fix for an engine operating 1,000 miles from a Navstar station, the apparent performance threat disappears. Position errors at that distance could run 10-25 ft. per

It should be recognized that accuracy comparisons are necessarily based on Navstar performance with experimental equipment versus VOR/DME performance in actual service use. Experience indicates that performance is frequently degraded in the transition from lab model to field use, because of practical interference and installation components. The same note of caution applies to estimates of Navstar size, weight, and price.

Losses Loomed: The military, probing from the latter Texas DME controversy which resulted from civil and military developments, have moved to get civil aviation participation in Navstar's development and evaluation. Delegates to the International Civil Aviation Organization's Fifth Communications Div. meeting recently journeyed from Montreal to Norfolk, N. H., for a technical briefing on Navstar by FTL. U.S. and foreign air carriers are expected to participate in the evaluation when it gets under way.

The first Navstar installation near RADC will be USAF based, because military providers had already been made. However the second evaluation installation on the West Coast will probably be sponsored by the Air Navigation Development Board with the Civil Aeronautics Administration. The two sites are expected to blanket the North Atlantic and Pacific. The West Coast installation will permit tests of the effect of nearby ionospheres on Navstar's propagation characteristics.

How It Works: Despite the similarity in services provided by VOR/DME and Navstar, there is a sharp difference in their principle of operation. A



NUMBERS IN () INDICATE RELATIVE STRENGTHS OF A, B AND C SIGNAL AT 40° BEARING

AIRCRAFT BEARING is determined from relative magnitudes of signals received in three pulses, each generated by alternate poles of the three stations.

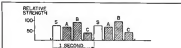
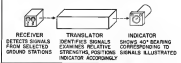


ILLUSTRATION OF SIGNALS DETECTED AT 40° BEARING (S DENOTES SYNCHRONIZING SIGNAL)



COMPARISON of amplitude of A, B and C is airborne translator performs the bearing indicator. Pulse S gives synchronization and distance information.

Navstar station transmits low CW (continuous wave) pulses, each of 167-millisecond duration, every second. By comparing the relative magnitudes of

three of these pulses, the airborne equipment establishes aircraft's current position relative to the ground station. The fourth pulse serves as a source of



Rem-Cru station is used extensively in such advanced production aircraft as the new North American F-400 Fury. Left and right are Boeing B-57D Superfortresses.



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FLIGHT TESTING OF Nuchlo system by Royal Air Development Center and Federal Telecommunications Labs engineers.

distance information and for synchro transfer purposes.

These signals are transmitted from three antennas located at the corners of an equilateral triangle, spaced roughly 4,000 feet apart (13.35 to 0.8 wavelengths). Each of the antennas is fed from its own 15-30 kw transmitter. The first of the three antennas is transmitted and continuously from antenna 1 and 2. After a brief interval, antenna 2 and 3 are excited, and then a pulse is transmitted from antennas 1 and 3. The last (fourth) pulse, transmitted simultaneously from all three antennas, is the transmission and distance measurement (see sketch, p. 54).

As each pair of antennas is excited, it produces a figure-eight radiation pattern which is rotated 90 degrees in space when the next pair is excited. By comparing the relative amplitudes of the three signal pulses (A, B and C), the antenna receiver and its associated bearing transmitter establish accurate bearing to the aircraft.

As inherent ambiguity in the bearing-measuring portion of the system means that an airplane will receive the same relative pulse amplitudes at geographically positions 135 degrees apart. However, a flight crew can be expected to know whether the plane is east or west (or north or south) of the Nuchlo station in order to remove this ambiguity. An automatic direction finder could also be used.

►Getting Distance Information—The relative phase between a radio wave measured at the transmitting antennas and measured at some distance from the antenna is a function of the distance between the point and the antenna. This is the basis for the operation of the Rho portion of the system. To measure this phase difference accurately requires a phase-stable, ground-based station and an airborne frequency standard of comparable accuracy (see part

is a below for 24-hour periods). If the RF operating frequency is already maintained, and if the mutual phase relationship between the airborne and ground stations can be established, then any change in phase is proportional to distance traveled by the plane.

In actual operation, the pilot would normally establish the correct relationship between the ground and airborne frequencies before taking off by setting in the known distance from the Nuchlo station to the point of departure.

►Ambiguity—A problem exists in this type of distance measurement because the relative shift wavelengths of the 90-210 kc Nuchlo carrier creates an ambiguity every 1.6 nautical miles.

To resolve this ambiguity, a 200-cycle signal is, in effect, transmitted during the synchronization pulse. At 100 cps, a second carrier, displaced by 200 cps, is transmitted simultaneously with the basic carrier. The 200-cycle beat frequency wave provides a wavelength measuring signal and the 90-100 kc wave provides the velocity measurement.

The 200-cycle wave has an ambiguity every 520 ft. (However this is not serious since the plane should know whether he is 500, 1,030, or 1,490 miles from the Nuchlo station.)

►Principle Known—While admitting that the Rho portion of the system needs further development, FTX men find in one of RADSC tests have "indicated the practicability of distance measurement through the use of a very high precision 'synchro clock'."

Rad Telephone Labs have been working to develop an airborne frequency reference with the required degree of accuracy. American Machine & Foundry has constructed a "breadboard" model of the Rho transmitter which has been used in U.S. tests.

►Nuchlo Propagation—The use of pulsed transmission at a relatively slow

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"ANGELS 401"

Production and delivery of the new, higher powered, rocket-firing Mark 401, CF-100 to the Royal Canadian Air Force is underway to equip squadrons at additional bases around Canada's vast territorial border.

With its radar tracking and fire control system, the Mark 401 goes much farther and exceeds the range of any other interceptor in the world. A CF-100 recently flew a 2160 mile R.C.A.F. non-stop mission in 3 hours and 50 minutes.

The role of this long-range, all-weather interceptor, powered by two OREIDA jets, also designed and built by AVRO Canada, is the defense of North America against attack through the Arctic. However, because of its inherent versatility, the CF-100 could be readily assigned to a variety of tactical operations.

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low impedance frequency adjusted may be available in the range of 300 cps to 100 kc. Manufactured quantities between: constant of less than 0.05% and an amplitude and frequency shift, from nominal to full-load, of under 0.1%. Nucleo Corp., 45 W. Glendale St., Pasadena 1, Calif.

Small Components for Transistor Circuits

They regulate and control, particularly suited to transistor circuits, are among the recently announced components of interest to system designers. We list includes:

• **Micro-miniature capacitors.** General Electric says it has quadrupled the capacitance of its recently announced micro-miniature line of low-voltage capacitors (Aviation, Week Oct. 30, 1955, p. 80) without increasing their size. For example, one measuring 1 in. dia., 5/16 in. long, is rated at 5 µf at 25 volts, instead of previous 2 µf. Device is designed for use in transistor circuits. General Electric, Capacitor Dept., Hudson Falls, N. Y.

• **Semi-conductor resistors.** New line of two resistors, only slightly larger than the kind of a resistor, for use in transistor circuits, is available in quantities of 50 ohms to one megohm, 21 or 0.25 watt. Resistors are formed by de-



positing positive material on ceramic base. Faces end is then coated. Units have a negative temperature coefficient whose maximum value is 0.25% per degree C, according to manufacturer, Glenside Corp., Metuchen, N. J.

• **High-speed diode.** New line of high-temperature germanium diodes, called "Red Dot," can be operated at temperatures up to 300C. Type C84 has a maximum back resistance of 100,000 ohms in temperature range of -30C



to 100C. Bulletin 211311 goes details. International Rectifier Corp., 1571 E. Grand Ave., El Segundo, Calif.

• **Passive semiconductor sensor.** For

cross resistance, would be accurate of 1%, 0.5% or 0.1%, or non-inductive ceramic bobbin, are available in standard resistances of 0.1 ohm to 1 megohm, 1 to 1 watt. Resistors are on proprietary for moisture resistance, and have temperature coefficient of 0.004-25 ohms/deg C, according to manufacturer, R.F. Development Co., 2616 Spring St., Redwood City, Calif.

• **High-power resistors.** New line announced since been added to the Shalomon Mfg. Co. line of high-power, high-temperature, lightweight units. One is MIL Type R 25, rated 12 watts, available in resistances up to 10,000 ohms. The other is Type R 35, rated 68 watts,

available in resistances up to 35,000 ohms. Bulletin L-25 goes into details. Company's address is Cal Ingels, Inc.

Company Activities Of Avionic Interest

Members of a company specializing in solving vibration and shock-mounting problems in one of several recent corporate moves of interest to the avionic industry. The new company, Tetra, is headed by E. S. Titus, formerly chief engineer of Robinson Avionics Inc., where he was instrumental in the design

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of metal mesh and ground vibration systems. Taylor's address is 371 Chestnut St., Ridgeville, N. Y.

Other recent acquisitions:

- **Perman Engineering Corp.** has been acquired as subsidiary of Motor Mobile Motors, Inc., which manufactures high-pressure paint and sealers. Address is 1343 W. Pico Blvd., Los Angeles 17, Calif.
- **Thompson Manufacturing Co.** has acquired Electronics, Inc., Charlotte (N.C.) manufacturers of printed circuits and a participant in the Navy N8B "Tiger" Tiger Day program.
- **Thompson Products, Inc.** has purchased Day Electronics, maker of television cameras, to expand its electronics activities.

- **Kierulff Co., Inc.**, has combined its engineering and sales functions at its plant at 1075 Main Ave., Chino, N. Y. Company has also opened a district office at 6113 Duane Drive, Dallas.
- **G. M. Gorman & Co., Inc.**, has opened new sales and field engineering office at 140 Park Ave., New York.
- **Electro Development Co.**, manufacturer of precision stampings and toolholders, has acquired Investment Components, Inc., maker of similar devices. Combined facilities are now located at Electro Development's plant at 4028 W. Washington Blvd., Culver City, Calif.
- **Magnuson Corp., P.O. Wayne (Ind.)**, manufacturer of airborne radar and computer aids (and TV), has been elected to RTCA.



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FILTER CENTER

• **Transistor Reliability Up**—Resistor transistors have scaled up over a billion hours of operating time in the field with a failure rate of approximately 15 percent, a company executive says. Failure rate during past six months has been even lower.

• **NELC Proceedings Available**—"Proceedings of the National Electronics Conference" for 1915 (Vol. 9), a 953-pg. bound volume containing the 95 papers presented last fall in Chicago, may be purchased for \$5 from NELC. Send order for proceedings to 84 E. Randolph St., Chicago 1, Ill.

• **New Precision Tube-General Electric and Bendix-Rohr-Rohr** have each announced new additions to their line of precision tubes. The new GE sharp cut-off pentode, 6C4-A105, is a sensitive, high-frequency amplifier, in a precision version of the 6B150. The new Bendix 618F is a twin diode intended to replace the 6C35/6B10 tube types. The 618F is mainly suited to audio vibration for 15 tubes, can be operated at 300 volts up to 10,000 dots, according to Bendix.

• **Revolute Control Airport Lights**—Special Commission 56 of the Radio Technical Commission for Aeronautics is investigating feasibility of remote control operation of field lights at controlled airports. Technique was pioneered by Louisiana Air Lines at Kingport (APR) airport (AVIATION WEEK Oct. 13, 1952, p. 92). By the addition of a variable impedance device to the airport VHF system it is possible for the pilot to turn field lights on or off by means of his radio transmitter and receiver.

• **Junction Transistor Sower-Hydro-Able Inc., Buffalo, Calif.**, East West Coast producers of point-contact transistors, is now making small quantities of junction types and expects to be in full production by June.

• **Mechanized Circuits Corp.** Penned-Sylvania has set up a new mechanized circuit department, devoted to supply of mass stamped and printed circuits, with Albert Lederman in engineering section head.

• **Electrical Synthesizer—Recent General Electric symposium on remote electric systems, held in Highland Park, Ill., attracted representatives from 16 U. S. and Canadian airborne manufacturer, 11 domestic and foreign airlines, USAF and Navy.** —FK

Avionic Bulletins

Recently announced technical bulletins and brochures of possible interest to the aviation industry include the following:

- **Radio data unit**, which would be developed and tested approximately three to five months, is described in Bulletin No. 2231 available from Sperry Gy. Electronic Laboratories, 1031 Maryland Ave., Silver Spring, Md.
- **Groundwater wind**—describing the application to instrumentation and control systems described in Bulletin No. 11-441, prepared by Westinghouse Electric Corp. P.O. Box 1000 Pittsburgh 12, Pa.
- **Time delay relay**, which is presently controlled delay at instant of testing required to be described in document in Bulletin No. 2232. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Flight log with**—describing an electronic system for recording flight data and including effects to make navigation, maintenance and aircraft control systems, including Technical Information Service, Edgett Corp. 211 Madison Ave., Princeton, N.J.
- **Temperature**—describing the development of a temperature control system and describing the use of a temperature control system in a temperature control system. The temperature control system is described in Bulletin No. 2233. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2234. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Radio antenna**—describing the development of a radio antenna system. The antenna system is described in Bulletin No. 2235. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2236. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2237. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2238. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2239. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
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- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2241. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2242. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2243. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
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- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2245. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2246. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2247. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2248. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2249. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.
- **Reliability**—describing a new technique in the design of electronic equipment systems. The technique is described in Bulletin No. 2250. Write to AGA, Inc., 22225 10th St., Chicago 28, Ill.

FLIGHT PROVEN!

Recently announced technical bulletins and brochures of possible interest to the aviation industry include the following:



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EQUIPMENT



RESEARCH AND TEST layout at Voths-Pioneer jet accessories.

New Setup to Test Jet Accessories

Eclipse-Pioneer facility will duplicate the operating environment of aircraft and missile accessories.

A vacuum and vacuum research and test facility, built exclusively for testing jet aircraft and missile accessory equipment, has just been completed on the 112-acre site of Bendix Aviation Corp.'s Eclipse-Pioneer Division, Teterboro, N. J.

Bendix says the new setup can simulate on a few seconds the actual conditions under which jet accessories will operate, including temperatures as low as -100°F. Test conditions are controlled from consoles which include the latest combinations of electronic, pneumatic and electrical equipment, the company says.

What Is With Test-Size of the products the Bendix setup is designed to test are altimeters, fuel gauges, water-activated pumps, radio-wave altimeters, bleed-and-burn turbine-driven accessories, cabin supercharger equipment, aerodynamic equipment, pneumatic meters and numerous other types of turbine-driven auxiliary equipment.

The facility simulates all possible flight conditions for Bendix equipment through control of exhaust systems, air pressure, air temperature, fuel injection rate, auxiliary cooling temperatures and fuel tank pressure and vacuum.

Man-Hour Saver—Designed to save thousands of man-hours of engineering research, the new research facility can provide data on performance of air turbine-driven accessories at speeds up to the supersonic and at altitudes ranging from sea level to 50,000 ft.

A pressure-cooling system can chill temperatures to -100°F to test equipment operation under extreme

cold conditions. Test cells can be controlled from -100°F to 100°F. Also, an oil-fired burner can raise temperature of compressed air used in the facility to 600°F. Maximum pressure of the air exceeds 200 ps. Automatic regulation can hold air at any pressure desired.

A master console in the equipment building gives extensive primary control of exhaust vacuum, air pressure, air temperature, and cooling brine temperature.

Current fuel system can handle high fuel flow rates at pressures up to 1,500 psi; flow rates and pressures may be increased later.

What Is In—The new layout consists of three buildings: the test house, the power and primary control equipment to supply coolant, high- and low-pressure air, heated air, fuel and other services.

There are two test cell buildings. The main one, a completely separate structure, is converted to the equipment building by numerous bays and cooling secondary control panels and a double test cell.

Test Cells—Elasticity provisions have been made in the major test cell building to make the entire area as safe as possible. Here are some examples: • Shock-resistant walls separating the two test cells from each other and from the control rooms. The special walls were designed to withstand a one atmosphere shock explosion.

• Pull-out-type air windows are built into the walls separating the test cells from the control rooms. Windows are

made of bullet-proof glass. Adjustable screens within the personnel room permit full view of the test site in the cell.

• Higher atmospheric pressure in the control room provides backup, of any explosion goes into the area where employees are working.

• Lightweight aluminum latches are installed in the roof of each of two test cells for explosion release.

• Explosion-proof electrical outfitting is used throughout for lights, switches and power outlets.

• Complete automatic lockups, with radio visual alarm, are installed in the master control console and at all the control panels in the test building.

• Water-tight fire-control system is installed in each test cell.

• Second Test Cell—Second test cell building in the project is designed to test combustion components which require high pressure (1,000 ps.) air. Accessories include fuel air combustion stacks, solid-propellant starters and similar types of high-energy and high-pressure air devices.

High pressures are produced by an automatically driven compressor, electrically driven compressor connected to a system of high-pressure steamers.

The project also includes a water cooling tower where water used by the compressor, exhaust, refrigeration system and other heat exchangers in the test setup is recirculated.

Brightness Control For Runway Lights

A brightness control regulator for high-speed switching of runway lights is being offered by Hov. Duty Electronics Co. The control is an electronic blocking out the lights when brightness control is operated.

Available for either direct or remote control, Hov. Duty's 4-lw. state-type control circuit regulates brightness by switching under Civil Aeronautics Administration specifications L-111 and L-112.

The regulator requires very little maintenance, uses no mechanical parts, rugged construction is simple, without complicated circuits or mechanical devices.

Each unit is completely self-contained, ready for installation on a supply voltage circuit from 108 to 250 v. by connecting the input, output and control terminals to the terminal board. Air-cooled design is featured, and units may be mounted on rack, panel, chassis, or in a rack or office space.

Recent aircraft designers target the lamps, increasing lamp life. Company says its regulator will operate under 20% of light at cut, without burning lamps. Hov. Duty is in Milwaukee, Wis.

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OFF THE LINE

Battery-powered ductless pull luggage trucks at Post World's Aeronautics Field. Powered by Goodyear batteries, the Freight Master trucks have a carrying capacity of 1,000 lb., negotiate a 75% incline ramp that has a 17% grade. Among reasons given for choice of battery-powered trucks is the reduced fuel and tire costs while making normal ascent, and also, fewer fire questions in enclosed areas.

Navy has awarded a contract to Lockheed Aircraft Service to overhaul and modify an undelivered number of Neptune F2V-5 and F2V 6 Neptune. The contract includes installation of special equipment used for submarine detection.

Airco Supply Corp., has been organized to act as warehouse distributor and purchasing agent of aircraft parts, engines, accessories, instruments and tools and various components. Firm is headed by Aubrey L. Moss, formerly executive vice president of Aero Materials Co., Addison, 159 Pennsylvania St., Brooklyn, N. Y.

Nylon fast cells are being installed by Adkins Aircraft Service Co. at two Lockheed locations owned by Good year Tire and Rubber Co., A. Minneapolis. Rexon Fast Corp. Lockstar is getting the same treatment. The cells increase the plane's fuel capacity to 530 cubic gallons. Another benefit is an easy to use, and it is claimed Adkins Aircraft Service Co. is the only processing and tooling and Goodyear authorized the bags.



Lighter Cooler

New Adkins Aircraft Service will give you and your lighter a new principal feature. This is achieved by introducing parts, thereby eliminating many coils, bolts, screws, washers, etc. It weighs 5.0 lb. and has a cooling flow rate of 1.0 ft. per sec. It provides 647 lbs. of refrigeration. The turbine operates directly on the heat of change, eliminating need for extra ducting.

NEW AVIATION PRODUCTS



Big Powder Metal Press Molds Parts Automatically

F. J. Stokes Machine Co. has built a 300-ton hydraulic press for automatic molding of large powder metal parts. The first model, said to be the largest powder metal press ever built in the U. S., has been shipped to an aircraft engine manufacturer, says the company. Parts are to be in an aircraft and approximately 3 in. thick, are said to be easily completed, while molds having a maximum depth of 6 in. can be handled.

Control over the molding cycle is fully automatic. Manufacturers may rate of production can be adjusted precisely to thickness of parts being completed. For thick parts, operation is at rate of four strokes per minute with thinner parts, rate increases to maximum of 18 strokes per minute.

Press is a double-acting design, with each of the rams independent, both as to speed of movement and as to pressure exerted. To achieve this, says the company, each ram has its own hydraulic pump and valve control.

A pair of threaded stops controls feed spacing between upper and lower punches. Adjustment of these stops controls thickness and density of finished parts at all times. Stokes reports. Control panel, located at front corner of press, allows instant connection from fully automatic to semi-automatic, or manual at any point in the cycle.

J. K. Stokes Machine Co., 5500 Tabor Rd., Philadelphia 23, Pa.

Transparent Vacuum Jar Gives Testers Clear View

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in large or small lots, from all types of stainless steels and other heat and corrosion-resistant materials. Unusually extensive secondary operation equipment, inspection and quality control facilities, and experimental and research techniques insure highest quality work. Capabilities from 1/32" to 3 1/2" round in bar machines—up to 8" round on lathes.



Bolts of this type, in aircraft quality, are produced in large volume. Bolts are made on multiple spindle New Britainers and parts are then processed through heat treating, form grinding, oil heating and roll threading.

Interesting features of this bolt are the hardness of Rockwell 28-30, non-critical requirement of 900 T.I.B. and squareness requirements of 402 T.I.B. In fact, surface under head and fly diameter are an exact number of 90 both in the hole.

This part is blanked on a multiple spindle machine, using 315" diameter tubing AMS 5645. Part is ground around in the fly diameter and an additional finishing is performed on a turret lathe. The entire internal diam. including all three internal diameters, tapered end, neck, front and back shoulder are made point turned on a Model 34 New Britain automatic boring machine. This is done all in one setting, to ensure the internal diam. being concentric and being within 0.002 T.I.B. with the hole diameter. The smallest internal diameter is then ground to a tolerance of .000.



Parts are blanked with a cut thread, cut of aluminum bar as a Model 66 New Britain machine. The Model 66 New Britain machine machine the square and at the square diameter of 1/2" 3/4, holding a total square tolerance of 0.018. Secondary operations include grinding the square and end view, multiple drilling wide holes and grinding threads in three different areas, maintaining a class 4 tolerance.



This part requires a hard shaft of Rockwell 40-45 and a depth of size of .325 to .045. The square shaft of 8 and the tolerance of .0005 on the O.D. are produced through grinding and lapping operations. Parts are made from AISI 52100 steel and processed in controlled lots to ensure proper depth of carburization and hardness.

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ALSO ON THE MARKET

Electronic safety chain, known as Tole-Trak, is designed for use on all devices requiring single trip or single-trip only test. Manufacturer states machine cannot be tripped except by simultaneous action of both hands, which sends single electrical pulse to the released—Brockmeyer Mfg. Co., 1835 W. Riverside Ave., Garden, Calif.

Tack cloth wipes dirt and dust particles from surfaces to be painted, and is recommended for use before spraying. Product, No. 708 Super Tack Cloth, is said to be particularly useful before smooth painting—Associated Products, Inc., 1017 East Fifth Mile Rd., Farm Park, Mich.

Explosion-proof portable floodlight is said to mount 100% safety in lighting of hazardous areas such as streets, parking areas, airport runways, etc. Manufacturer says unit has never received unfavorable approval and is only floodlight permitted for use in hospitals, airports and manufacturing gas areas—Safe Lighting, Inc., 51-01 Astoria Blvd., Jackson Heights, N. Y.

Electric-grade plastic tape (F 301) is reported especially suitable for use as electronic equipment as a shielding barrier where high frequencies are involved, also for a shock-resisting and as a noise deadener in heavy-duty equipment manufacturing. Characteristics are: Flexibility and high elongation of backing, allowing good conformity over sharp and irregular surfaces, strong, non-repeating moisture protection and cannot leakage, and extremely low moisture vapor transmission rate of backing.—Pennell Tape Corp., New Brunswick, N. J.

New towing tractor, with rubber and aircraft compressor tires, has maximum drawbar pull of 7,500 lb and is equipped with an 81-hp. Chrysler 6A engine with dual carburetor, planetary-type drive shaft, four wheel brakes, two-piece forged steel and full steel deck and run along tracks. Tires are completely interchangeable. The Chrysler 75 costs \$14,500, 70 is \$12,000, and a used one for export—Clark Equipment Co., Battle Creek, Mich.

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AVIATION SAFETY

CAR Report on Regime Cargo Airlines DC-3 Crash

Pilot Flew Visual in IFR Weather

THE ACCIDENT

A Douglas DC-3, N 19941, owned and operated by Regime Cargo Airlines, Inc., crashed 12 miles northeast of Vail, Wash., about 20 miles from McChesed AFB, Tacoma, Wash., between 1030 and 1050, Sept. 1, 1953. The two pilots and 29 military passengers were killed. The aircraft was disintegrated by impact and subsequent fire, the site of the accident was the north side of a 3,000-ft. timbered ridge at approximately 2,000 ft. mean sea level.

HISTORY OF THE FLIGHT

Regime Cargo Airlines, Inc., an employer of aircraft, was flying its flight as a Commercial Air Movement from Fort Ord, Monterey, Calif., to McChesed.

The flight, with Capt. Eugene Jones, Co-Pilot, and Capt. Donald M. Dettmer, as co-pilot, and 19 military passengers, departed Monterey, Calif., at 1455, Sept. 1, 1953, on a flight plan specifying IFR (instrument flight rules) en route to Fort Ord, Calif., via the Coast Range, and then to McChesed AFB. The estimated time of arrival was 10:40 and 20 minutes, with no hours and 40 minutes left. The flight crew had been briefed on weather in Navy weather presented at Monterey, and the flight was given AETC traffic clearance for 500 feet on top was given to McChesed AFB. The trip proceeded to Portland, Ore., in a routine manner, making several pattern turns and estimates of time over the next 10 minutes. These times closely approximated EETAs.

At Portland, at 1620, after reporting and receiving weather for Portland, Tacoma, Washington, and McChesed, the flight continued to IFR flight plan, showing that the trip would be completed VFR, with an estimated time of arrival over Tacoma at 1841. The two pilot radio contact with the flight and there are no known radio contacts in the rest of the flight in the radio. Search was started shortly after the flight became overdue at McChesed. The crash was found by a weather station a half mile away on the opposite side of a ridge at a time he estimated to be between 1900 and 1950. He did not associate this crash with an aircraft being a crew. Located the next morning, when he investigated and located the wreckage.

INVESTIGATION

The flight's estimated ground speed from Portland to Tacoma was 164 mph, and the crash scene is 16 miles north of Tacoma and about 25 miles north of the destination. A confirmation of the same course of this ground speed indicates a crash time of 1845. No instrument was recovered from the wreckage due to severity of impact and extreme ground fire.

ANALYSIS indicated in Tacoma that the aircraft was disintegrated and that the crash was the result of impact and fire.

The fall test was done at the highest point between Tacoma and McChesed AFB, and is approximately 1,000 ft. MSL. The aircraft crash in level flight at approximately the 1,000 ft. level on Sliver Number 1. At the time of impact the heading was 360 degrees magnetic while the aircraft's course was 315 degrees magnetic.

Investigation revealed that both Capt. Jones and Co-Pilot Dettmer had flown over the region several times during the past few months, and that the aircraft and its flight had continued several times which show elevation along this strip.

The weather was generally consistent with reports of steady clouds with a 4,500-ft. ceiling reported in the Portland area, heading 1,500 ft. at McChesed AFB. Fifteen miles west of the crash, there was heading in the constant through which the aircraft could have descended. The actual 1750 weather conditions given the flight by Portland radio while over Portland was: Portland 4,500 ft., scattered, ceiling, visibility 3 1/2 mi., altimeter 30.85 in., Tacoma 2,200 ft., scattered, broken clouds, ceiling 1,500 ft., visibility 2 1/2 mi., altimeter 30.08 in., McChesed weather steady at 1,500 ft., ceiling 3,000 ft., visibility 2 1/2 mi., very light drizzle, altimeter 30.05 in. Temperature was high enough to prohibit wing ice formation in flight.

An Air Force pilot was flying a small aircraft northbound from Eugene, Ore., about 180 miles north of Portland, to Tacoma at about the time of the accident. Actually he passed over a point about 15 miles west of the accident site at about 1900, about 45 minutes before the accident. He described the weather in the direction of the crash as fog and showers on the hillsides.

This pilot was well qualified and he was familiar with the terrain near McChesed AFB. He offered the opinion that steady flight from the crash site to McChesed would not have been possible at that time. His flight was entirely steady and he was able to see the ground at all times from his altitude of about 1,800 ft. MSL. However, because of the low ceiling and visibility he headed at or near a few miles to the west of where he had intended to land, a small report near McChesed. The ground where he headed the area of impact described the weather in rain with clouds on the roof.

There appears to have been no engine malfunctioning or fire on flight and no structural failure prior to impact, nor did the crew report any difficulty. All aircraft instruments were found in excellent condition. The cockpit area was an extremely damaged first instrument, including the altimeter, could be read.

Examination of the engine and propeller indicated power development and inspection of the propeller discs revealed a minor pitch position of the blades at the time of impact. The gross weight of the

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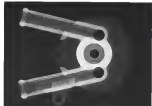
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aircraft at time of takeoff was 23,652 lb; its maximum weight was 25,346 lb. The aircraft's center of gravity was located within permitted limits. There was ample fuel aboard.

Norwegian facilities consisting of two hangars, ramps, which the aircraft was equipped to receive were in normal operation. The setting of the aircraft's engine pressure was about 210 lb, both the possibility of impact changed. Takeoff range is as 130 lb and McClellan is as 373 lb.

The military had notified a few minutes before the aircraft's takeoff that the aircraft was scheduled to fly for a few minutes. The aircraft was not on the north leg of the McClellan takeoff range. The two minutes before the aircraft's takeoff, the aircraft was not on the north leg of the McClellan takeoff range. The aircraft was not on the north leg of the McClellan takeoff range. The aircraft was not on the north leg of the McClellan takeoff range.

Investigation of the operation and positioning of these two air carriers, together with study of a speed-distance diagram of the flight, indicated that the aircraft was not a candidate factor in the accident. Actually the crash site was well out of either end of the takeoff range of the aircraft (the Lake F. M.) as proved during subsequent flight check. The CMA was to have been notified 24 hours in advance of this facility being tested. In the meantime, notification was not given.

ANALYSIS

There appears to be no factor relating into this accident other than an attempt to fly visually at too low an altitude during instrument weather. Between Takeoff, which was about 15 miles north of the crash site, and McClellan about 35 miles ahead of it, the ground on the runway is relatively level, except at the crash site. There is a ridge of high land property westward from the crash site, and the aircraft was not able to see the ridge until it was close to the summit of this ridge where the airplane struck.

A legal action, therefore, is to put what caused the effect to be so low as that he must have believed himself to be some what closer to his destination than he actually was, and was attempting to fly visually in instrument conditions. This time that the aircraft struck, it is highly likely that the hillside was correctly observed by clouds, so that it would have been responsible to fly by visual reference. Moreover, Capt. Jones did not ask for a change of flight plan which to original instrument altitude which would have allowed the flight to proceed safely.

Furthermore, had the captain refused to the instrument climb, the aircraft would have been and safely visible prior to its at the time the flight plan was changed to VFR. It would have had knowledge of the height of the terrain and any possible obstructions between Portland and Tacoma, particularly

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beyond Toledo. Either Capt. Joser did not refer to those charts or he relied upon his knowledge of the terrain, possibly believing that he was beyond the ridge.

The 1936 weather furnished no temperature at about 1405 p.m. McChord conditions, including the altitude setting, about the same as at 1730. The weather was not conducive to night-precision changes. There is no way of ascertaining if Capt. Joser received the last altitude fix.

FINDINGS

On the basis of all known evidence the Board finds that:

1. The course, the search and the time were properly established.
2. The aircraft was loaded to a weight less than its maximum allowable and its center of gravity was located within permitted limits.
3. The aircraft was aerobically:
4. All ground cabin facilities were functioning normally.
5. An instrument flight plan had been cancelled and the flight was proceeding in accordance with visual flight rules.
6. The crash occurred during daylight on a fog-covered hillside at an altitude of about 3,400 ft. MSL.
7. The crash site was on the corner and the direction of impact was near the nose cone leading.

PROBABLE CAUSE

The Board finds that the probable cause of this accident was the pilot's attempt to continue flight under the provisions of visual flight rules during instrument conditions.

BY THE CIVIL AERONAUTICS BOARD:

/s/ Chas. Gurney
/s/ Hester D. Doney
/s/ Donald Ryan
/s/ Bob Lee
/s/ Joseph F. Adams



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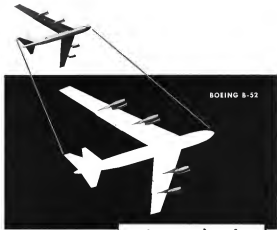


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FINANCIAL

UAC, C-W Report Postwar Peaks

New postwar profits in sales and earnings for 1955 are revealed in the separate annual reports for United Aircraft Corp. and Curtiss-Wright Corp.

These two major companies, whose engine and propeller production predominates, revealed a number of striking similarities in several placements last year and both held out the promise of sustained good results for the immediate future. (Aeronautics News 12, p. 28).

■ **United Aircraft** reported total sales in excess of \$117.5 million for 1955, up 32% over the previous year. Net operating income, before taxes, rose to \$68.7 million for 1955 as against \$58.4 million for 1954. With an overall tax rate of about 38% for the last year of the major profit tax, the company was left with a net income of \$32.2 million for 1955, compared with \$17.8 million for 1954. Last year's net earnings were equivalent to \$6.22 per common share, against \$4.18 for 1954.

Profit margins showed a slight improvement, before taxes, rising to 3.5% for 1955 from 7.7% for 1954. However, after taxes, net profit margins declined to 2.6% from 3.7% for 1954.

■ **Curtiss-Wright** revealed total sales of \$433.7 million for 1955, up 34% from the previous year. Net operating income before taxes reached \$55.6 million for 1955, against only \$29.9 million for 1954, a 69% gain. With an effective tax rate indicated at around 68%, also reflecting the lost savings of excess profits taxation, net income for Curtiss-Wright amounted to \$14.4 million for 1955, up from the \$9 million for 1954. Net earnings were equal to \$1.28 per common share for 1955, compared with 94 cents for 1954.

Total margins, before taxes, reached 5.1% for 1955, up from 6.4% of 1954. The tax impact can be seen in that net profit margins averaged 2.6% last year, down from the 3.6% of 1954.

■ **Program Payments**—The new government policy on postwar payments and its impact comes in for special mention by Curtiss-Wright. But its impact is evident in both reports.

For example, of total investments supporting \$214.6 million in 1955, 90% was financed by government postal payments. At the 1952 year-end the same company showed total investments of \$91.1 million, with 35% covered by postal payments. It held out the actual amount of the postal payments received above the same, between \$56-\$56.9 million.

United Aircraft's program payments also increased on the same level for 1952 and 1953, from \$114.2 to \$114.9 million against \$114.5 million. However, at the 1953 year-end, of total investments of \$128 million, postal payments accounted around 50%. For the 1952 year-end, total investments were \$215.3 million, with postal payments accounting for 33% of the total.

■ **Capital Expenditures**—The two companies also reveal substantial capital additions for plant and equipment additions and expenditures.

United Aircraft reports that for the four year period starting with 1954, plant and equipment increased by \$75.9 million before retirements and writeoffs of \$149.5 million. For 1953 the company reports to have increased its fixed assets by more than \$5 million after amortization. Most of United Aircraft's additions to fixed assets during the emergency period are covered by contributions of materials, as provided for under the tax regulations. An average 75% of the cost is being amortized for two purposes over a five-year period. Such amortization as reason of depreciation at regular rates charged its income in 1955 was \$5.8 million, compared with about \$3.8 million in 1952.

Curtiss-Wright's report does not reveal the detail of capital expenditures for plant and equipment additions for last year or several periods. An independent check made by this writer, however, shows that for the eight-year period since the 1946 year-end, Curtiss-Wright increased its gross plant assets from \$26.1 million to \$72.8 million. Most of this expansion took place during the early part of this period. Only \$5.5 million appears to have been expended for this purpose during the last two years.

■ **In Good Shape**—Spring financial positions are confident for both companies. United Aircraft averaged its working capital from \$67.6 million at 1951 to \$79.9 million for the 1955 year-end. Curtiss-Wright showed working capital of \$91.3 million at the end of 1955, down slightly from the \$93 million of a year earlier.

Standard "payoffs" were about the same for the two companies. United Aircraft paid a total of \$2.75 per share in dividends on its common stock, or about 45% of available earnings. Curtiss-Wright paid \$2.00 per share on its Class A common stock and \$1.00 on its common. Its total dividend pay also averaged 53% of available earnings. United Aircraft is now on a regular 75

cent quarterly basis. Curtiss-Wright last already declared the full \$2.00 dividend for 1954 in its "A" stock with an initial 15 cents per share on the common.

Buildups continue very large among retained reserves for the same reason. United Aircraft last reported total cash of about \$1.5 billion at the 1955 year-end. Curtiss-Wright showed unutilized cash in excess of \$365 million.

Engineering, research and development expenditures continue very high for the two companies. Curtiss-Wright plans such expenditures at about \$47 million for 1955, up from the 1952 year-end of \$43.7 million. Both do not reveal a breakdown of such costs but they also are known to be substantial.

■ **Chance-Vought Operations**—In connection with the proposed acquisition and distribution of Chance-Vought Aircraft, United Aircraft reveals for the first time the nature of that division's contribution to overall results. Chance-Vought at the 1955 year-end reported about \$138 million of United Aircraft's net worth. This division averaged about \$2.7% in 1954 to 15.8% in 1951 at total sales but contributed 7.4% of 1955 year profits and 14.3% of 1955 earnings before taxes.

With Chance-Vought emerging as an independent company, United Aircraft and Curtiss-Wright will become more nearly responsible in the nature of their operations. Since, of course, Curtiss-Wright is a major element of United Aircraft and there is no evidence that the division will follow the course of Chance-Vought in the foreseeable future.

The fact remains that engines and propellers are the backbone of United Aircraft and Curtiss-Wright and both companies have done well in this enterprise.

—Selig Axtell

Cessna Pays Wallace \$65,000 in 1953

Cessna Aircraft Co. paid its president, Donald L. Wallace, \$65,353 salary and \$21,667 bonus during fiscal 1953 ended Sept. 30, the firm reports in Securities & Exchange Commission.

Thomas R. Salter, vice president-engineering, received \$14,867 in salary and a \$12,313 bonus. Frank A. Reutter, vice president-factory production, received \$13,490 salary and \$14,800 bonus.

All officers received a total of \$174,983 in salaries and a total bonus of \$68,971.

The firm reports Wallace holds 68,568 shares of common stock, Reutter 2,000 shares, Salter 2,900 shares, Coleman, director, holds 880 shares and Gerrie McDonald, director, 7,700 shares.

ATA Rakes Nonskeds in Senate Hearing

- North American Airlines draw fire for concentrating on rich longhaul traffic without CAB certificate.
- Sen. Smithers says that skeds have raised the only objections to money-making operations of irregulars.

By Katherine Johnson

The scheduled airline industry had its ear against non-scheduled operators—particularly North American Airlines, one of the most aggressive of the non-scheduled operators in the Southwest and the Pacific Northwest and the Foreign Commerce Commissions in both money in Stuart Tipton, general counsel of Air Transport Area.

Tipton's 100-page document on the newCAA Bill set forth not only the objectives of supported by ATA but did not mention on the specific provisions of the McCann measure. In calling for continued regulation of non-scheduled and irregular airlines, the newCAA could be made as North American Airlines Certificate. "We are traveling well loaded, but we are making money and on one is relying to them except their competitors," Sen. George Smithers said. "We are solving to the fact that they should be put out of business?"

Tipton replied that he concerned with the newCAA of the McCann Bill said about the exemption services for non-scheduled operators and believed that North American should be covered by such a certificate for its operations.

The ATA will present two clients to demonstrate the two cases: one is First Air, the "North American Combination" in Boston down into a number of small airlines to give the members of small time, "irregular" operators, but actually is controlled by five individuals.

Second, the member's financial system is due to a concentration on lucrative longhaul traffic. But the scheduled airlines' record is poor, as far as local operations as far better than North American's, Tipton declared.

Organization—Tipton's chart of the North American organization showed a four-tiered organization of independent entities all controlled by five individuals: Bruce Hart, Jack Lewis, Louis Fickelberg, Stanley Wolf and Donald Ruchman.

In the first tier were five "airlines" holding operating certificates from Civil Aeronautics Board but possessing no planes: Trans National Airlines, Trans American Airlines, Hemisphere Air Transport, East Express Corp and

Twentieth Century Airlines, which Tipton said operate the other five "airlines."

In the second tier were "teams of airlines" who supplied the "airlines": Twentieth Century Airlines Co., Standard Airlines, Standard American Co. and California Aircraft Co.

In the third tier were the retail agencies, sales organizations for the companies: Viking Airlines Agency, North American Airlines Agency, North American Airlines Agency, Standard Airlines Agency, Airline Tickets, Inc., Airline Reservations, Inc. and Airline Reservations, Inc.

In the fourth tier were the "local agencies": Republic Air Coach System Corp and Republic Air Coach System, partnership.

ATA View—Tipton sought to debunk the "pyramid" claim of North American and other airlines.

"They have taken the DC-3 and the DC-4, which were developed by the certified carrier," he testified. "They have chosen the richest routes in the United States. They have made adapted the oldest means in the transportation business—single seat planes to longhaul, high-volume routes and use one self transportation cheap and make money."

"This is not the work of a pioneer. This is the last part. The pioneering for these operations was all done. There is further pioneering to be done in the air transport business, but the airplane is not doing it."

Tipton's second chart showed that 49.1% of North American's business is the 100- to 1,500-mile route and that 49.1% is in flights of more than 1,500 miles. That only 17% of the "Big Five" business is on this lucrative area seemed not to do it.

The chart showed that the "Big Five" cost per mile was compared favorably with North American's 2.6 cents to 3 cents in the 100 to 1,500-mile category for the "Big Five," compared with 4.6 cents for North American 3.3 cents to 3.3 cents for the "Big Five" in the over 1,500-mile category, compared with 3 cents for the scheduled.

Accouch Board—"The most charitable response that can be placed on the contribution of the airlines," Tipton said the committee, "is that they have accelerated the introduction of new service. Even this is not true, however, since the industry still is responsible for substituting coach loads on a significant number of flights. Airlines did this as early as 1949 as a two-step, New York Chicago operation."

"The best example of the development of coach service, is in an area where the irregular carriers have never participated. In the international field, U.S. certified big carrier airlines have been virtually nonexistent in the world, domestically, the U.S. certified airlines provide coach service to close to 70 cities, including many with less traffic than one single city served by the irregular operators," Tipton said.

Drawn Recognition—Other points in Tipton's testimony were:

- "Domestic competition" proposed by the McCann Bill, abolishing CAB and creating a new regulatory body, would be a failure to take over its functions and part of the present functions of Civil Aeronautics Administration, "is not necessary or wise."

TWA Pushes Coach
The class is to be pushed through in New York, Chicago, Los Angeles and San Francisco airports as a part of TWA's extensive nationwide advertising campaign to boost coach traffic.

Turkey Asks U.S. Aid In Updating Airways

Turkey, a strategic halfway between Russia and the West, is seeking U.S. assistance in establishing a more and more airway system.

A team of Civil Aeronautics Administration's aeronautical experts recently returned from Turkey where they investigated the civil aviation system and the Foreign Operations Administration. Their recommendations:

- A modern, U.S.-style airway system.
- Proper operations and maintenance facilities to support the service, an extensive training program.
- A Turkish civil aviation advisor and staff, organized along the lines of CAA.
- Modernization of Devis (Istanbul to Ankara), the Turkish airway.
- U.S. aircraft agreement to American Airlines' investment to derive single source to supply the airway with modern equipment.

Back in Constantinople-Turkey has received considerable interest in road, coming in an transportation system in order to compete more successfully with foreign airlines. Pan American World Airways is present in the only American airline that serves Turkey, flying into Ankara, the capital.

Improvement of Turkish service is as much as a boon to foreign aircraft as security. Modern equipment reasonably could attract more traffic to Turkey, reducing its losses in world markets.

As an international airway, good service would be available. CAA has had an interest in Turkish aviation since 1946, when it sent the first team to make a survey of aviation conditions. The most recent mission to Ankara wrapped up the basic needs of the civil aviation.

U.S. Constant Equal-Treatment agreement to the Turks to establish an up-to-date aviation system would cost about \$145,000 annually for about three years, the CAA team determined. Cost of managing DHT, generally a nationalized airline, is figured at \$300,000 a year for three years.

CAA has recommended to Turkey that the airline consist of a U.S. airline in order to attract a more modern, efficient company.

Concerning DC-3s—the service team suggests that 52 airplanes be put into the fleet for the purpose of new aircraft, a three-to-five-year period. DHT now operates 30 Douglas DC-3s within Turkey and outside in Athens, Beirut and Cairo.

Delivery is expected in April of 38 de Havilland House transports for domestic operations. There are 16 passenger aircraft. Meanwhile, DHT is seeking in DC-3s to replace its fleet in The Netherlands for conversion to 74 seats.

Should DCA approve the recommendations made by the CAA team, money will be appropriated to support the program out of foreign operations funds.



FSF Honors Kurtz for Airline Pamphlet

Howard G. Kurtz, Jr., issued from right, aviation contributions from the Civil Aeronautics Board, U.S. Department of Transportation, and the Federal Safety Foundation (FSF) to Kurtz for his pamphlet, "The Common Man Up in the Air. A Study of the Psychology of Passenger Behavior in Flight." With Kurtz and Kurtz on FSF president John H. Tvers (USN Ret.) (left) and managing director James L. Kurtz. Kurtz' pamphlet was significant because it emphasized the

the issues for increasing aviation and showed passenger firm and overall passenger cooperation, especially in emergency. Kurtz said. He indicated that 75,000 copies of this pamphlet have been reported by major airlines in most areas of the world, translated by Robert O'Brien, the work originally was printed by FSF in 1955 and was quickly republished in Dallas, Tex. of International Air Transport Assn. Kurtz is a travel pilot and industrial engineer, until recently was with Pan American World Airways.

TWA Pilots Threaten to Walk Out

ALPA fights removal of navigators on Rome-Cairo route, refutes CAA claims of improved air nav aids.

By Frank Sheu, Jr.

Trans World Airlines last week faced the possibility of a mass "walk-out" of its cruise pilot fleet as a result of the company's action ending the removal of navigators from all flights flying the Rome-Cairo Mediterranean route.

Pilot fights without exception are unlikely to go into operation this week. TWA's international pilots have sworn oaths that they will not board the plane without a navigator and threaten a ground work stoppage if the company attempts to compel them to fly.

1,400-Men Walkout-Threat. Initially, the problem centered around the international pilots only. But last week, at a major executive council meeting of the Air Line Pilots Assn., TWA's domestic pilots said at their problem too. Working firmly behind the international group, they passed a resolution whereby all Trans World pilots, 1,400 strong, would walk out if they were required to fly the Mediterranean route without benefit of navigation.

The airline management, on the other hand, stands just as firm, insisting that the navigators will be taken off the crew this week. Company officials met with pilot representatives last Monday, but neither group would budge. Management officials declared they definitely "will be removed." The pilots countered with, "We won't fly."

Safety Agreement. The pilots last week signed on the safety factor involved, holding that the removal of flights over the Mediterranean between Rome-Cairo and Rome-Layds (Lodi) Island, along its present equipment and communication facilities in that area without aid of a navigator, would be an unsafe operation.

"We're not necessarily sticking up for the navigators in this fight," explained a pilot spokesman. "All we know is that we won't them today in the Mediterranean area. We can't rightly accept our common sense response before we've heard them."

CAA Backlog. The company, on the other hand, had Civil Aeronautics Administration's backlog in the matter. A CAA staff of aviation safety advisers, headed by Theodore Ekins, recently received from a year of the new and reported that "slowly and continuously improving" navigational facilities in the Mediterranean area now are sufficient

to permit operations without navigators aboard the flights.

The agency listed its recommendations for removal of navigators on the following:

- The Technical Assistance Mission of Greece has provided several high-powered beacons and advanced communication facilities in and around Athens.
- Radio ranges have been consolidated at Cairo.
- A new non-directional radio beacon has been installed at Alexandria.
- Two high powered beacons are at strategic points on the island of Crete.
- Another high powered beacon has been installed on the island of Rhodes.

In addition, CAA reported that frequency assignments have been adjusted by various governments in the area and that the former difficulty of finding a clear channel for radio transmissions has been cleared up.

No Improvements. Pilots flying the route, however, pointed out a number of shortcomings in these statements. Their operational reports indicate that no additional facilities of any consequence have been provided since CAA's July 1955 study, in which it was recommended that navigators be retained because of "inadequate facilities."

They further argued that CAA fails to be specific in listing "new" improvements, because CAA admits that there actually haven't been any since their last adverse decision. "In one pilot put it: 'If anything new has been added, it would not help if the pilots knew about it.'"

Proof by Point. The pilots took CAA's list of most improvements and wrote them point by point. Here's their story:

• The only improvement in Greece since July 1955 was an increase in the

writing output of the Athens scope from 100 to 1,200 w. But this had to be brought back down to 800 w. due to interference with the frequency of other messages. The result, said the pilots, was no improvement in Greece.

• As far as consolidating of radio ranges at Cairo is concerned, which claimed it was "new" to assist CAA consider painting and using the equipment as "secondhand."

• The beacons at Alexandria is not new even though placed in July 1951.

• There have been no changes in facilities on the islands of Crete and Rhodes since July 1951. In addition, present facilities on these islands have frequently been found "inoperative" or "off the air" when aircraft are attempting to establish contact.

• Frequency assignments are constantly being adjusted by various governments in the area.

• The difficulty of finding a clear channel for radio transmissions still exists.

Drinking Problem. The pilots also said there is a distance of approximately 500 miles between Crete and Alexandria over open ocean with no facilities whatsoever from Constantinople, Italy, to Alexandria, they argued, there is a distance of over 1,000 miles with no radio or navigation communication facilities.

"If I have to ditch my airplane over all that water," said one spokesman, "I want to be able to get a fix on my location and be able to tell someone where to come and look for me. I cannot take undue responsibility over human lives, and I cannot conscientiously ignore the safety of my passengers without the aid of a navigator."

Recommendations. In a special report, TWA international pilots make the following recommendations:

- Development and establishment of reliable, independent, full 24-hour operating radio aids to navigation over every route flown by TWA aircraft.
- Installation of more VOR stations across and at terminals, and improvement of the reliability of and continuous operation of VORs in countries at Pass and Rome (pilots report facilities are not as continuous operations).
- Improvement of and reliable full-time operation of ILS facilities at all terminals.
- Continuation of the present crew complement, including radio operator and navigator, over all TWA routes where it is established by a combination of the majority of pilots flying those routes that, segment by segment, the facilities are adequate.

One major criticism of CAA's action in recommending removal of the navigators over the Mediterranean is that the pilots concerned were never

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Safety Record

Colomb Airlines recently completed 24 years of fatality-free operation. During this period, the airline carried 2.5 million passengers over 925 million passenger-miles involving approximately 750,000 landings and takeoffs.

In addition to the "safe fatality" record, Colombia also reports that there have been no serious injuries to either passengers or crew members.

crashed. Pilots claim that their views were not selected, and that when they were offered CAA advice to land. Pilots say that, according to CAA suggestions, pilots must be contacted prior to any new radio approach including one change.

Repeated efforts by American West to obtain the viewpoint of TWA officials were unsuccessful. A company spokesman reported that the man most familiar with the situation was enroute to the Midwest and was not available for comment.

Pilots at the company's chief office in Denver, adding that not only would the "exceptional" planes be saved but also the absence of a mandatory situation aboard the "cocked-back" Configuration 74A would leave them for an additional eight passengers.

Union Attacks ATA In CAR Cockpit Fight

Flight Engineers' International Assn., representing about 1,500 engineers at the nation's airlines, has attacked the existence of the Air Transport Assn. (ATA) since April 5, p. 36) as the fight for return of Civil Air Regulations.

William D. Kent, FEIA president, claims the matter "is a five-year jurisdictional dispute within the AF of L," he terms his organization and Air Line Pilots Assn. "an arm of the role of the flight engineer in the cockpit of all four-engine aircraft that require a flight engineer."

Regulation Change—"We have tried for five years to settle the dispute within the role of AF and direct between us and the pilots without success to date," Kent says. However, the matter is before the AFL Executive Council now and will be decided shortly.

"It is my view that the Civil Airline Board has exercised sound

judgment in adopting sound safety regulations on the Part 40 rules that govern all carrier licensing, checks, certificates and sign-offs. The new regulations do not incorporate all of the changes which we felt were necessary or desirable but they are sound and a great improvement over the old rules."

The provisions of the act in question deal with:

- Need for a crew member familiar with the flight engineer's duties to provide emergency coverage should the engineer become incapacitated.
- Requirement that a certificated flight engineer be a member of the crew on certain aircraft.
- Overlap of the duties of the flight engineer as required by Part 40.
- Recent engineering requirements and accounts for a flight check of an engine.

CAA's amendments became effective April 1 when it denied ATA's request for a 90-day postponement. The Board found that ATA's petition failed to give any specific reasons for which the regulations were not in the public interest and the flight engineer became so stressed that as many candidates were actually rejected.

It adopted Part 40 of the regulations April 1, 1953, which actually was to become effective Oct. 1, 1953. This was subsequently extended to Oct. 1 and later to this month, one year after CAA originally approved the amendment.

Strike Halted—Eastern Air Lines pilots one of the most participants in the controversy (American Week May 21, p. 72), immediately voted to strike but were stopped when the National Mediation Board declared the case under terms of the Railway Labor Act.

NMB will mediate the case, probable in due for the proceeding. Eastern pilots merely question an interpretation of new amendments they believe would

restrict the authority of the pilot and require him holding a flight engineer's certificate.

FEIA Agreement—CAA has concluded ATA's proposals to the industry for comments to be submitted to the Board before June 1. FEIA is busy preparing its response over the question now.

"The connection between ATA's attempt to reject the AFL certification case between FEIA and ALPA as a major reason to the work about the airplane in the Civil Air Regulations committee escapes us," the union president members.

"ATA's reliance on 'radio cockpit atmosphere,' 'stress in the cockpit' and 'safety in the cockpit' as an excuse for its transportation" are belied by the everyday operation of cockpit teams consisting of the flight engineer in the world's most transportation system," he adds.

"That ATA should engage in this campaign to undermine the work of CAA and all concerned parties in arriving at one, better suited regulations and improvements in flight safety by affecting an area of regulation about the airplane is equally dangerous to the safety of the public."

"We have never taken such a position," he says. "The position referred to elsewhere has nothing to do with the labor protection problem within the AFL. The CAA's interpretation was on a Part 40 matter of the pilot's continued existence, extends to every part of the airplane and even crew member and passenger. We have never questioned that fact."

"We are opposed to the elimination of the flight engineer certificate proposed by the 13 airlines for holders of commercial pilot certificates," he continues. "If the elimination of a flight engineer certificate is a simple fact holders of commercial pilot certificates, they should not object to meeting the requirements as all flight engineers have done heretofore and looking at the written and practical examinations set out in regulations and the CAA."

FEIA Position—Kent members, "The American public and the U. S. government should not have to shell out too money for flight engineer licenses for pilots who do not require them to perform their function as pilots. Nothing should the reform committee be blackpainted into having to shell out the millions of dollars it would require to allow flight engineer certificates for all of the pilots."

"On the question raised by AIA as to the checking of flight engineers," he says, "it is our opinion that crew validation can be checked for all flight crew members by the check pilot. The check of the individual competency of each specific person as to his knowledge and ability to perform the duties of the flight engineer must be done by a check engineer who has the confidence of the airline being checked and who is not engaged in the same occupation as the person being checked."

"We hope that AIA doesn't involve us in the involving public that they consider a man qualified if he has a little to 50 hr. in the preceding 12 months. The new Part 40 safety rule requiring 50 hr. in the preceding 12 months is a very simple rule and we support it. The required flight check or simulator check for a man who becomes delinquent in this requirement is an absolute necessity."

CAB ORDERS

(Page 115)

AUTHORIZED

Trans World Airlines to visit service at Edison, Tex.

REMOVED

Southwest Airlines Co. motion to defer trial date in the Federal Air Lines case to discuss several case for simultaneous discussion with Southwest's certified annual report.

Flight Engineers' International Assn., Cincinnati, to later Chapter (NFL) pilot for later to interview in the Civil Airline Transport Air Lines dispute case.

Kellogg, Ind., Board of Western Communications and National Chamber of Commerce petition for new air certificate American Airlines Chicago Detroit route in September.

Engineers' Communications of American petition for new air certificate for foreign air carrier permit and authorization documents with the Federal Aviation Commission of TACA in September, October 15.

Kellogg Airlines petition for extension of its application to serve Philadelphia.

REMOVED

Air Carrier Mechanics Assn. petition for trial of one of its members, alleging that Eastern Airlines negligently a withholding claim benefits to which the employee is entitled.

Shirley Sawyer and William E. Hoffman petition for approval of settlement negotiations among them. Hoffman is now president of Sack and Director of Daniel, Ray & Tempert.

APPROVED

Intercompany agreement between Eastern Airlines and Western Air Lines and Western Air Lines.

Temporary suspension of interchange service involving Continental Air Lines and United Air Lines between Seattle, Wash. and Tulsa, Okla., from April 25 to April 27.

ORDERED

Investigation of Transamerica Air Lines from between Corpus Christi and Honolulu. Emergency certificate of pilot certificate and accident to be issued to Western Air Lines.

Issuance of a license or permit to issue to Lincoln, Texas. Certificate of S. A.

Approval of personal and house interlocking and common control system for engine. Issue to E. McKinnon's petition in parallel and director of State House Airline while building electrical office in the Houston Transportation Co. plus related and covered of both companies.

EXTENDED

Suspension period of family pilot from of Century Air Transport, Carol Lakes Air Lines and Missouri Air Service for further suspension from April 30 to July 19.

Suspension period of certificate and permit from proposed for State House Airline by Alaska Coastal Airlines, United Air Lines, Pan American World Airways, United Air Lines, Western Air Lines and West Coast Airlines.

GRANTED

Public Airline application for extension of its certificate that would authorize operations between Stennis Boulevard, Fla., and New York.

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Tax Cut Reduces Air Travel Cost

Air travel for a 55 lb. man on each \$100 purchase as a result of the reduction in the transportation tax from 15% to 10% on April 1.

Here are the changes in ticket costs over major routes:

	Previous		Since April 1	
	Regular	Couch	Regular	Couch
New York-Chicago	\$51.87	\$57.95	\$49.66	\$56.30
New York-Dallas	102.35	72.46	97.98	69.30
New York-Los Angeles	181.55	113.85	165.64	108.90
New York-Miami	88.21	58.26	84.37	55.55 (L.A.)
New York-Boston	15.07	10.81	13.57	10.34
Chicago-Seattle	171.96	103.75	126.21	97.90
Chicago-Miami	82.15	58.26	78.81	55.55
Los Angeles-San Francisco	25.56	15.53	24.26	14.95
New York-Washington	86.56	32.77	13.84	12.21

An Industry's Conscience

(Wherever we go around the country, readers express their interest and surprise at the free expression of opinions on this page. They also are surprised to find any individuals in an aviation magazine that point out anything wrong with aviation. The publishers of *Aviation Week* desire the harshest, not the softest. The reader freedom gives the editors a powerful ingredient for successful journalism—material not only in content but in such intangible qualities as reader respect and influence. This freedom makes it possible for the editors to denounce and carry out such a platform as the one below. This creed was first published here Aug. 4, 1951. Since then, we have acquired thousands of new readers, and we reproduce the following thoughts especially for them—*AWW*.)

Criticism

First, criticism here is always meant to be constructive. We want aviation to progress. We have abundant faith in aviation's future. But although this is an aviation business paper, we don't have the editorial attitude that everything about aviation is perfect, or that we defend industry whether it is right or wrong. We are the spokesman for no group within industry, nor are we anyone's lackey. If we had wanted to "play it safe," *Aviation Week* would have discontinued its editorial page long ago, as some business magazines have done. But in that case we would have followed industry, seldom nudged it forward, and never led it.

The Platform

The crux of our editorial policy is to encourage the fastest development of aviation to serve safely and efficiently the most people at the lowest cost. We think that can be done only by private initiative in the free enterprise system.

The platform above covers aviation as well as commercial aspects of aviation. Today we refer mainly to commercial aviation.

Safety

Aircraft must strive vigorously, relentlessly, and forever for greater safety. It is the top problem, above.

Subsidies

We are against any subsidies that can be avoided, or those that are not dissipated as losses in the industry phase games for no advantage to the nation. Subsidies should be reduced at the most rapid possible rate; that good business methods and improving income will proceed.

Competition

We favor competition in both manufacturing and transport. We shall always urge a fair hearing to those who ask an opportunity to do a better job at less cost. Monopolists in business should be allowed to have no monopolies in sales. If monopolists care they can set up a yardstick for the advertiser, give them a certain bid, and let them in if the old guard refuses to improve its ways. Few companies or industries operate at maximum efficiency without some penalties or threat of it. Progress is made by those who are

perpetually daunted with the status quo. Aviation shares the status quo as nature abhors a vacuum.

Because we believe this, we supported the daylight line in their long fight for certification. We have supported a trail for the assumed passenger carrier for twelve months. If any of them succeed in carving a niche for themselves, making a new market and serving it, they should stay.

Government

Our attitude toward government—whether it be CAA, CAB, the Air Force, or the President of the United States—is that fundamentally government is the servant—not the master—of the people.

One of the obligations of the press is to reflect the will of the people. We have confidence in public opinion and in the intelligence of Americans. We hope to lose few opportunities to bring to light any public servant who gets too big for his job and fails to remember his proper place in the scheme of things in this democracy. Let him not forget who pays him, and why. The people have a right to know, concentration, and able service on the part of those in their government. They have a right to expect decisions based on public service, not on politics and self-interest. They furthermore have a right to know what their government is doing and how their money is being spent—except for the most strict national defense work.

Government Regulation

We are for all possible industry self-regulation and as little government control as possible. The more independent of government subsidy an industry is, the stronger can be its arguments for self-regulation. The better its product is, the less can government be in taking over industry or any part of industry's job. In transportation, we believe CAA has done more to affect commercial aviation in the past four years than it has done to subsidize it. In manufacturing, industry's trend toward self-regulation by government order then industry laws allowing possibilities.

Service & Lower Rates

Aircraft cannot continue to lose new patrons from surface transport, or persuade others to use aviation for business if their services would not conduct at all, unless rates for all air services remain low or drop in relation to other transportation. So we have little patience with those who seek to pick up rates to the public merely to pile profits on profits. The big profits will come, but only if aviation becomes mass transportation.

We have aimed away for maximum development of aviation, because they encourage unnecessary bills and bring lower fares and mass transportation that reach aviation.

Public Welfare First

An industry that puts its own interest ahead of the public's is doomed to a sad and uncertain. Sometimes that painful day comes quickly, sometimes it lingers hesitantly in the background for years. But it always comes. So, we view *Aviation Week* as more than a chronicle, analyst, tracker and narrator. Perhaps its editorial page can also be an industry's conscience.

—Robert H. Wood

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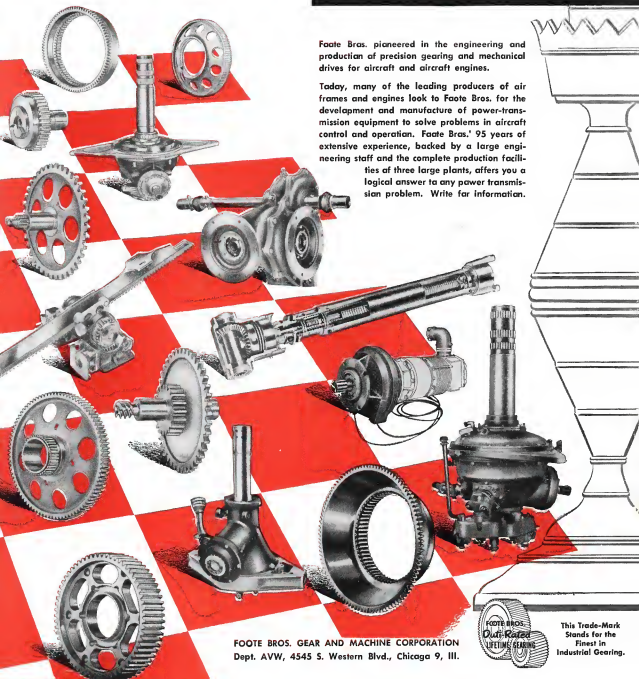
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